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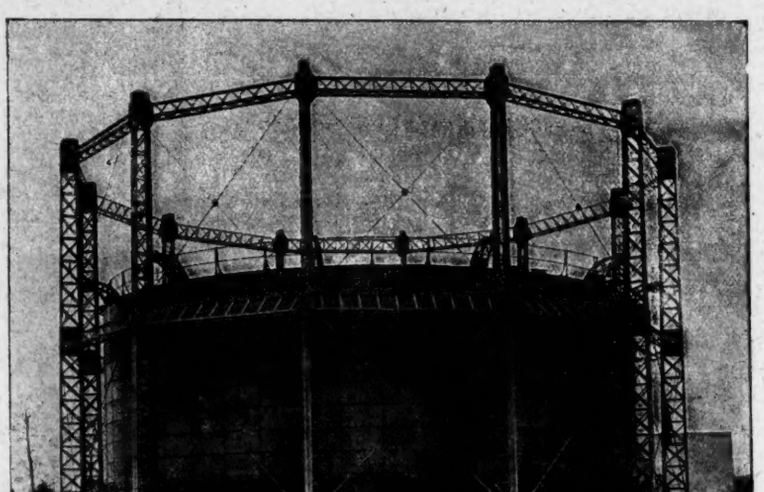

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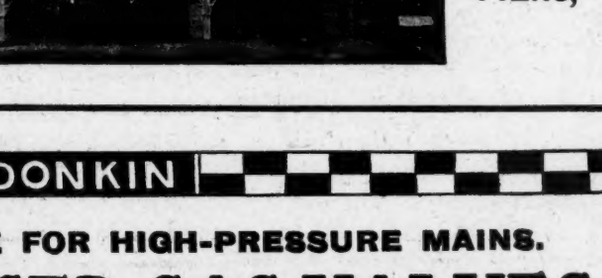

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VOL. CXLVIII., No. 2951.] TUESDAY, DECEMBER 2, 1919. [71ST YEAR.

EDITORIAL NOTES.

Coal Price Reduction, and Certain Complications.

WHEN the price of coal rose 6s. per ton after the famous Sankey interim report, the public groaned over the fresh burden; and the miners lustily protested that it was unnecessary. Now that the Government have announced a reduction of 10s. on household coal but not on industrial, householders are gratified, but not manufacturers, coal-owners, and coal dealers. The gas industry is pleased that there is to be a 10s. drop of the price of the coal used for the provision of household gas, but is somewhat disturbed over the complication that the conditions of the reduction will entail. The announcement of the Government's intention was a surprise to everybody. No one imagined, though a reduction had been promised, that it would have such magnitude or limited application. A 2s. or 3s. universal reduction had been anticipated. But what has been done and what it is proposed shall be done, look highly speculative, and are certainly well embroidered with complexity. The reduction of 10s. on domestic coal is not being made on an economic basis; and, with a shifting foundation, it is impossible to say how long it will last. The ability to make it can only continue so long as the price of export coal remains high, and production continues at about the present, or reaches a better, level. In both respects, assurances are not of the soundest. In the coal debate last Friday, Sir Auckland Geddes said: "We have no certain knowledge, "we cannot have any certain knowledge, either in connec-"tion with the future output or the price. We do not even "know what the winter will be like." Inland coal, it is stated, has been selling at a loss of about 3s. 4d. per ton; and it has been subsidized to this amount from the profits made on export coal. Now there is the 10s. extra—making 13s. 4d.—to go on to the 36 million tons or so annually used for household purposes, and the proportion of the coal employed for providing household gas and electricity. The three combined will probably amount to some 54 million tons. As to coal production, the week ending Nov. 15 showed a falling-off on the preceding week—the respective figures being 4,679,402 tons and 4,804,456 tons. Output depends largely on the miners' temper and will; hence the uncertainty of maintaining what are, according to British estimate, regarded as good (though not high relatively to other countries) outputs.

It is only right that those householders who use gas as a fuel, and so do not pollute the atmosphere as do householders who burn coal, should not be penalized for their good behaviour, but should also have the coal used for gas production supplied to the gas makers at the reduced price. At the same time, it is a great pity that the Government did not avoid complexity by reducing the price of all coal used for gas making, irrespective of whether it was for domestic or industrial use, seeing that such a large proportion of the total is required for gas for domestic purposes. No doubt the National Gas Council has already brought this subject before the Coal Controller and Sir Auckland Geddes; but the repeated references in the House last week to the division between household and industrial gas satisfies us that the two Departments have definitely settled upon this as the right course of action. There are various ways in which the dividing-line between household and industrial gas can be determined. One is, of course, by each undertaking having an investigation of the accounts of its customers. But probably the data that the Household Fuel and Lighting Order has made available will show approximately where the dividing-line should be drawn. In fact, the National Gas Council, in a communication issued on Friday, says the reduction "will apply to "the coal used for domestic consumers—*i.e.*, those supplied "under the certificate issued under the Household Fuel and "Lighting Order." The experience with regard to the working of the Order should also be of assistance in facilitating the application (so far as gas undertakings are concerned) of the regulations that will attach to the reduction in the price of coal.

The public have been led to the conclusion, by statements in the Press, and by the hasty manner in which the decision to reduce the price of coal by 10s. was made and promulgated (which gave no time for the Government first to consider practical matters affecting the step they were taking), that the price of gas and electricity would be lowered at once by an amount that would be the equivalent of the 10s. The idea that the price of household gas would be reduced as from yesterday has not been fulfilled. It could have been dismissed when Sir Auckland was talking in the House eight days ago. The meter inspecting and clerical staffs of gas undertakings may have done some amazing things when a heavy task has been set them; but they could not produce on Dec. 1 the exact condition of every consumer's meter at midnight on Nov. 30. The Parliamentary Secretary to the Board of Trade (Mr. Bridgeman) stated in the House on Thursday that, on the subject of the adjustment of the prices of electricity and gas, the Coal Mines Department was in touch with the interests concerned; and so we should imagine that, as there is only a month to run before the end of the quarter, the reduction in the price of gas will be made to date from then. In the past no increase in the price of gas has been made, following an increase in the cost of coal, until the end of the then current quarter.

As to the vision of the price of gas being reduced to an extent that would have equality with the 10s. per ton reduction in the price of coal, the authorities at Whitehall, the newspapers, and the public did not early in the week appreciate that the factors affecting the price of gas are more than the single one of the cost of coal. There is also to be a reduction, in line with coal, of the present maximum price of coke used for domestic purposes, but not for industrial. The Local Fuel Overseers are to review the retail prices. Thus the reduction of the price of domestic coke will, of course, dispose of part of the 10s. reduction in the price of coal. That is not all. There is the stock of coal accumulated at the gas-works at top prices for use at the period of maximum gas demand this winter, and for the protection of gas supply and the consumers. The difference between the cost of the stored coal and the new cost has to be paid for one way or another. It has been reported that coal dealers will be compensated for the difference in price of such part of their stocks as is sold for domestic purposes. If this is to be done in the case of coal dealers, why should not the same apply to the coal stocks of gas companies, who are the suppliers to the public of a more refined fuel from the coal? Compensation would simplify matters considerably. Then as the National Gas Council has pointed out, the Unions representing gas workers have put forward a further claim for 10s. a week for adults and 5s. for juniors; and this claim is being submitted to arbitration in the near future. If the workers obtain anything further, it will mean that the reduction in the price of gas will have to be subject to this adjustment also. Further there is the prospect of railway rates being increased. Had the Government Departments taken preliminary counsel with the authorized representatives of the gas industry, the gas-consuming public might

have been shown (instead of being misled) that the full benefit of the 10s. reduction in the price of coal could not in the circumstances be realized from gas all at once, if at all.

The gas industry, however, welcomes the reduction in the price of coal, not the complication involved. But as the powers that be have ruled that the one cannot be had without the other, then both the reduction and the complication are taken with good grace and a thankfulness somewhat modified by the thought that it is not all as we could have wished.

The Beilby Report Approved by the Public Control Committee of the L.C.C.

IT is with considerable gratification that we see from the minutes of the Public Control Committee of the London County Council that they agree with the report of the Board of Fuel Research, and recommend its acceptance by the Council. The Committee have given full consideration to the whole question; and they are of opinion that the recommendations mark a distinct advance from the point of view of the consumer in the methods of gas supply. It will be remembered that the Council were represented at the conference at which the amendment of the original report was discussed, and a compromise arrived at. The decision of the Public Control Committee, particularly if endorsed by the Council to-day, will be valuable in shaping the attitude of local authorities generally to the reform. Our gratification over the decision is the more sincere, because it has fallen to our lot to at times criticize rather severely the conclusions of the Public Control Committee in relation to gas affairs. It is our earnest hope that the present decision is a definite turning-point, and that henceforth the Council will work with the gas companies for real progress in distributing heat in gaseous form, and realizing from the coal carbonized the highest efficiency. Knowledge of these things has grown considerably during late years, and this knowledge points the way to economy. The co-operation of local governing bodies in promoting such a public service as gas supply is the right course; obstruction to progress is indefensible.

Further Gas Bills for Parliament.

IN our "Parliamentary Intelligence" to-day, we give the second batch of notices of Bills and Provisional Orders to be promoted in the coming session. Most of these fresh notices emanate from local authorities; and we are pleased to see that so many of them have been looking round with a view to find pastures new for the development of their gas enterprise. Among them are Blackpool, Coventry, and Halifax; and, in the expansion process, the first-named Corporation are planning to absorb the Thornton Urban District Council's gas undertaking. The Rugby and the Southend Gas Companies are also extending their areas; and the latter are proposing to take over the small works at Rochford. So area-extension and gas-manufacturing concentration proceed, which is an excellent policy. The Rugby Gas Company, it is also noticed, have in contemplation a new works scheme. Some of the local authorities are going to include clauses as to calorific power standards and maximum prices. The Southend Company are also proposing to deal with the standard price and sliding-scale of dividends. As suggested last week when referring to the South Metropolitan and other Bills, we should imagine such clauses as these will be subject to the provisions of any General Act passed during the session as the result of the Gas Bill that the Board of Trade have in preparation. Another prominent gas-works purchase scheme is that launched by the notice of the Sunderland Corporation. Power to purchase coke-oven gas is still developing; two Welsh undertakings—Pontypridd and Tredegar—being among the applicants. In the shape of Provisional Orders, the industry is again working-up the level of its business with the Board of Trade.

"Modern" Durham Coal.

WITH the gas undertakings of London and the South of England, the Durham coalowners have for a great many years done a large amount of business; and till a few years ago there was, generally speaking, satisfaction with the coal. But there is now growing dissatisfaction among gas men with the deliveries of some of the Durham collieries, on account of inferior quality, and the large proportion of dust and small. We are constantly hearing reports of its inferiority to coal from other sources; and when at the recent meeting of the Southern District Association of Gas Engineers and Managers, the President (Mr. Frank Livesey) referred to "modern" Durham coal, there was laughter. Judging from the feeling that has been engendered, we are certain that, if it were not compulsory just now for them to have seaborne coal, there are gas undertakings that would at the earliest opportunity change the source of their supply from Durham to elsewhere. There is another consideration for the Durham coalowners; and it is that, with the growing application of the system of steaming charges in retorts, Durham coal, containing a large proportion of dust and small, will not permit of the highest carbonizing and steaming efficiencies being obtained. Such coal sits solidly in the retorts, and resists the rapid transmission of heat and the proper travel of the steam through the charges—thus rendering results poor in comparison with coal from other quarters. Where steaming has been adopted, preference is therefore turning very considerably from Durham coal. With all the changes that are proceeding in gas manufacture, and will proceed at an accelerated rate if the Board of Trade Bill to carry out the recommendations of the Fuel Research Board passes through Parliament, the marketing position in relation to Durham gas coal (if it does not improve) will become decidedly worse. The Durham coalowners ha better take warning and look into this matter, or they will find there will be a progressively large abandonment of the use of their produce in gas-works.

Doubts and Fears.

THE address that Mr. John E. Morfett, Distributing Superintendent to the Sunderland Gas Company, delivered at the Auxiliary Meeting of the North of England Association last Saturday week, is just one of those deliverances that are required at this juncture, because, if there is doubt existing in the minds of any officials in the gas industry as to the trend of modern development in gas supply, it is better that it should be cleared up than be allowed to continue. All will agree that it is highly advisable we should get as nearly unanimous as possible regarding lines of policy. It will be noted that these auxiliary meetings are held for those members and associates who are not eligible for the meetings of the General Purposes Section of the Association; and these are men, we take it, who have largely to do with distribution and so come into contact with consumers.

Mr. Morfett appears to entertain some doubts as to the Government electric power scheme; but he has no fear if the price charged for electric energy is a commercial one, and the scheme is not subsidized. And he speaks of it being unfair for the Government to compete with undertakings, such as gas companies, working under statutory powers. We have now before us the electrical scheme as amended and passed by the House of Commons; and one of the most obvious things about it is that the Government intend that it shall be self-supporting. Save for a few enabling powers to the present electricity distributors, the whole scheme is intended to have as its goal the consolidation in defined districts of the generation of current, so as, it is hoped, to produce greater economy. It is true the Government are going to support the scheme initially by the loan of several million pounds; but this has all to be refunded with interest to be determined by the Treasury. This interest cannot be below the amount at which the Government can themselves borrow; and whatever part of the money is spent will be upon prevailing market values of material and labour. Reviewing the position, we can hardly call this Government competition; and, as a matter of fact, the scheme does not appear to us so formidable as it did at the first blush when politicians were talking somewhat wildly about the proposals before they had matured, and before we had in black and white a definite presentment of what was contemplated.

The prospective competition of electricity is one of the reasons that weigh with Mr. Morfett in declaring against the calorific power of gas being brought down below 500 B.Th.U. In his address he says: "In face of the coming "competition with Government-aided schemes, it certainly "warns one to supply the best possible, and not lose faith "with the consumers." He emphasized this in his reply to the discussion: "In face of the present competition,

"and that of the future, by the Government's offer to "push electricity, the standard should not be placed below "500 B.Th.U." We have dealt with the part the Government are going to take in "pushing" electricity, which is not great, beyond facilitating the reorganization of the electricity industry on its generating side. It seems to us that, if competition is going to be keener and stronger, the gas industry should endeavour to supply as many B.Th.U. as possible—of course, consistent with efficient application—for a given price. Gas manufacturing developments have assured us that more B.Th.U. can be realized per ton of coal purchased and handled by going below 500 B.Th.U.; and if we can sell B.Th.U. cheaper by producing more per ton of coal, then we have there one of the strongest possible weapons with which to fight any advantage accruing to electricity from future generating developments. We must not lose a single opportunity. If the principle of the sale of B.Th.U., and not cubic feet, is correct, then let us grasp it while the opportunity offers. So far as consumers are concerned, we must not pin our faith to any particular thermal value of gas without remembering that, within a range suitable for town purposes, the higher the thermal value the greater the quantity of air required for complete combustion, and *vice versâ;* so that per volume of mixture we have approximately the same number of B.Th.U. at the point of combustion. Then how, if pressure and regulation be right, will consumers be injured? Whatever the value of the gas within reasonable limits, provided means of adjustment and nozzles are right, the main features of appliances of good design will suit all towns. We must adapt ourselves to progress, and not check progress by allowing inclination to keep us in a rut. With the lower-grade gas better admixtures are obtained, less primary air is required, flame temperatures are improved, and the same sensitiveness to slight variation of calorific power is not noticeable, as it is with the higher thermal power gas. With the higher-grade gases, more scrupulous care has to be taken in the matter of adjustment. We do hope there will be no settlement upon calorific powers without taking into consideration all the facts, including manufacturing economy, which affects the charge upon the heat-unit basis to the consumer. The meter-makers might note that Mr. Morfett is anxious to secure a consumer's meter which will occupy less room than the present type, and which will be accepted and be authorized for use.

Blue Water Gas Making in Glasgow.

THERE have been several papers of late upon the production of blue water gas for admixture with coal gas; and so much is now known as to the correct principles to follow in the making of this gas that of trouble little is now heard, and working proceeds smoothly. It would seem, however, that the experience in Scotland is not uniformly devoid of trouble—not trouble due to the plant itself, but to the physical characteristics of the coke, owing to the nature of the coal obtainable under coal control; and until this is removed, trouble is likely to continue. To coal control the gas industry owes much of its difficulty. Coal control would have had greater efficiency if it had extended its energies beyond the saving of ton-miles to the supply of coal suitable to the purposes for which it was required. The economy that would have resulted from this would have had a bearing not only upon conveyance saving (the cleaning of the coals particularly would have had a bountiful effect upon the quantity carried), but would have enabled gas-works and other industries to operate much more efficiently. We see the effects of unsuitable coals, and consequently of coke, in the working of the three Humphreys and Glasgow carburetted water-gas plants (each of a capacity of about a million c.ft.) at the Temple works of the Glasgow Corporation, the operation and results of which in making blue water gas are described in the paper (published to-day) that was read by Mr. M'Nicol before the Western District of the Scottish Junior Gas Association.

It is not expected that a carburetted water-gas plant will work quite so efficiently in making blue water gas as a blue water-gas plant specially designed, although the ability to carburet is a convenience which few gas engineers possessing it would readily give up. It is the experience with clinker in the generators—clinker of adamant properties, and to dislodge which it has been difficult to find a ready means—that is one of the principal features of the paper. Troubles such as Mr. M'Nicol described are not common in England—that is to say, not to the same annoying degree—and it is not universal in the water-gas plants of Scotland. In these days of dirty coal, coke with an ash content up to 43 p.ct. (with an average of 22 p.ct) is not unknown, to their annoyance, to gas engineers in England; seeing that over 30 p.ct. has often been shown by analysis of coal during the period of control. So the explanation for the difference in the degree of clinker trouble as between Glasgow and English works must be looked for in other physical characteristics. The ash of the Glasgow coke seems to have a very high fusion point; being high in silica and alumina, and low in alkaline salts. There is little doubt that this is the cause of the excessive trouble; and partial relief, or relief which will bring the trouble down to about normal experience, will only be secured when there is freedom to make a better selection of coal in the open market. Relief has been sought by making changes in the cycle of operations; and the cycle that is now the practice (as described in the paper) is the one that reduces the rate of the growth of the clinker to as low a point as can be effected. Glasgow would be very grateful if some one could furnish information as to the easiest means of clearing the generators of the accumulation. The American system of playing cold water upon the hot clinker with a view to fracturing and loosening it has been tried, but accompanying troubles have caused abandonment. On the other hand, Mr. David Fulton, of Helensburgh, has found the method efficacious, which suggests that there is clinker and clinker, requiring more or less drastic measures. It would have been interesting if Mr. M'Nicol could have given positive evidence regarding the physical properties of his coke, and Mr. Fulton of his, as the difference of experience with the water-dousing system suggests that the variation of these properties is the direction in which to look for diversity in experience. Another heavy trouble has been with coke dust; but the application of dust interceptors will, it is anticipated, be for this an effectual cure.

The cost of the blue water gas in Glasgow—14·39d. per 1000 c.ft.—is rather high; but this is explained by Mr. M'Nicol. Mr. W. W. Townsend, in his paper on the same subject before the Eastern Counties Gas Managers' Association last spring, gave his cost as 9·86d.; and it is not a new plant, but one subject to excellent control. Other gas engineers, running smaller plants, have since published their cost at a fraction over 12d. The generator coke at Glasgow is somewhat heavy, at 50 lbs. per 1000 c.ft.; and this alone, charging the coke at 33s. 9d. per ton, accounts for 9·15d. of the total cost. The cost of the breeze used for steam-raising at 1·2d. is about double what it would be were it not that the steam plant works under some disadvantages, which are described towards the end of the paper. The analysis of the gas does not show-up quite to what it should be, with 7 p.ct. of nitrogen in it and 4·5 p.ct. of carbonic acid. But this again is attributable to the extraordinary trouble with the clinker. The total incombustibles is at least 5 p.ct. higher than is found at some works. The time is coming when water gas will be expected to play an important part in keeping down the total percentage of inerts in the mixed gas; and so the higher the percentage of combustible gas the better. However, when Glasgow is able to choose its own coal, we hope some of the impediments to higher efficiency in blue water-gas making will, at all events partially, disappear.

Mr. H. E. Jones on Some Current Blunders.

A letter full of vigour from Mr. H. E. Jones appears to-day in our "Correspondence" columns. It sounds an alarm, or rather two. The first is in regard to the question of the 20-10ths pressure in any main or service-pipe of 2 in. diameter and upwards. The second has reference to the reduction of the price of coal, and the discrimination that will have to be made between domestic and industrial consumers. The letter came to hand yesterday morning as the "JOURNAL" was passing through the final stages for "going to press," so that we can do no more than direct our readers' attention to an item in the contents of this issue which should not be missed.

The "Any Form of Energy" Amendment.

The Electricity Supply Bill was read the third time in the House of Commons on Wednesday; and there will be gratification in learning that the objectionable phrase in sub-section 2 of

clause 15, which would have given the District Boards power to supply "any form of energy" in addition to electricity has had a proviso linked-up with it which renders it perfectly innocuous, so far as the gas industry is concerned. What could not be done when the Bill was under discussion by Standing Committee B was accomplished in the House on Tuesday. The amendment which secured what was wanted was moved by Captain Bowyer. It provides that in no case shall a district board or authority have the power to enter into arrangements for the supply of any form of energy other than electricity in any area in which any undertakers have been authorized by Parliament to supply such form of energy, until such undertakers consent thereto, and upon agreed terms and conditions. This is highly satisfactory; and at the offices of the National Gas Council it is probable the issue is regarded as good reward for perseverance.

Coal Control to be Modified.

During the discussion over coal prices in the past week, a great deal has been heard about the Coal Control Department. Among other things, Sir Auckland Geddes, the President of the Board of Trade, has announced that it is proposed at an early date to modify the present system of coal control, which, in his opinion (as it is in that of a good many other people), is unnecessarily hampering. What is contemplated is that the coal control machinery shall be gradually transformed until it consists of three parts only: (1) Limitation of the amount of coal to be exported; (2) Limitation of owners' profits; (3) Special limitation of the price of coal supplied for domestic purposes. Sir Auckland says the modifications are to be brought about as rapidly as circumstances will permit, which looks as though gas undertakings will before long again have an open coal market. On another occasion, Mr. Bridgeman, the Parliamentary Secretary to the Board of Trade, stated that the number of officials, experts, and staff employed in the Coal Mines Department at Oct. 31 was 859; and the cost of the Department for the ten months ending on that date was £121,900.

International Engineering Training and Facilities.

We are reminded of the suggestion that M. Rouland made in the eloquent speech that he delivered on the occasion of the visit of allied gas engineers to France in October. The report of the speech and an editorial comment upon it appeared on Oct. 28. M. Rouland, it will be remembered, urged that some scheme should be devised whereby there could be greater commingling of technical gas organizations, co-operation of their talents, and fusion of their knowledge. On this he said he would like to see provision made which would enable "our young gas engineers, at an age when their intellectual powers and inventive faculties inspire a courageous spirit, to move in the important technical circles of the various allied countries, and be given opportunities of study . . . . in the great gas undertakings of the respective countries." He believes that in this way general progress would be more rapid. Things are moving in this direction. A British section of the Société des Ingénieurs Civils de France, has been formed, with offices at 49, Great Marlborough Street, W.; and the inaugural meeting has already been held at the Royal Society of Arts, on which occasion all the important engineering bodies were represented. Noticed among those present were Sir Dugald Clerk, the President of the Institution of Gas Engineers, Sir Charles Parsons, and our old friend Mr. C. H. Wordingham, of electrical fame. The policy of the section was described by Mr. T. J. Gueritte, the President. It aims at forming a link between British and French engineering societies by drawing them into close contact with each other, and keeping them informed of important forthcoming papers or meetings in either country; also at promoting personal and friendly intercourse between British and French engineers, and at inducing British engineers to take an active interest in the work of the French societies and French engineers who sought admission into British institutions. A scheme is being set up for the exchange of engineering students and young engineers between the two countries and to secure a recognition in one country of the university degrees or diplomas conferred in the other. Cordial approval was given to the formation of the section.

The will has been proved of the late Mr. William North, of Stourbridge, who left estate of the gross value of £15,166.

THE TEN SHILLINGS COAL PRICE REDUCTION.

BOARD OF TRADE ANNOUNCEMENT.

The following announcement was received, towards the end of last week, from the Board of Trade in reference to the 10s. reduction in the price of coal:

The Board of Trade have made an Order reducing by 10s. per ton the pithead price of all coal dispatched from collieries in Great Britain on or after Monday next, the 1st of December, for household and domestic purposes in the United Kingdom.

The Order provides that the reduction of 10s. per ton shall also apply to coal supplied for the production of gas and electricity for household and domestic purposes.

The Order entails a reduction of 10s. per ton (or 6d. per cwt.) as from Monday in the maximum retail prices of house coal; and instructions to this effect have been issued to Local Fuel Overseers, who have at the same time been requested to review the present retail prices of gas coke in view of the reduction in the price of coal.

Factors, merchants, and dealers ordering coal for re-sale for domestic or household purposes are required to give to the seller a certificate to the effect that the coal will be re-sold or used exclusively for such purposes. Coal shall be deemed to be bought or sold for domestic or household purposes only when it is bought or sold for the purpose of supplying consumers under the provisions of the Household Fuel and Lighting Order, 1919

Directions have also been issued by the Controller of Coal Mines under which all coal supplied by collieries for bunkering ships engaged in the coasting trade of the United Kingdom (including fishing vessels, tugs, &c.), on or after Monday next, the 1st of December (including coal supplied under existing contracts), shall be charged at fixed prices specified in a schedule appended to the directions. These are the present Schedule A prices, less 6s. per ton. These revised bunker prices correspond as closely as practicable with the present home limitation prices for industrial coal.

Where bunker coal is sold to a broker, merchant, or exporter, the broker's, merchant's, or exporter's commission on re-sale must be charged by way of addition to the colliery price.

Board of Trade, Nov. 28, 1919.

COMMUNICATION FROM THE NATIONAL GAS COUNCIL.

The National Gas Council have issued the following notes in regard to the reduction:

The National Gas Council are given to understand that the 10s. decrease in the price of coal which has been recently announced by the President of the Board of Trade will apply to the coal used for the production of gas to be supplied to domestic consumers—*i.e.*, those supplied under a certificate issued under the Household Fuel and Lighting Order.

The concession granted will enable many gas undertakings to reduce their charges for gas used for domestic purposes. The Council would like, however, to point out that this reduction must not necessarily be expected to be in the neighbourhood of 10d. per 1000 c.ft., as indicated in the Press and other quarters. There are other important factors to be borne in mind which have a bearing on the matter.

The price of coke for domestic consumption, for instance, is to be reduced from its present maximum on Monday next. This will affect the revenue of gas undertakings (most of which have a very large number of domestic users among their purchasers of coke), and to that extent will reduce the amount available for the lowering of the price of gas.

Another uncertain factor is the cost of labour. The Unions have put forward a further claim for 10s. per week to adults and 5s. to juniors; and this claim is being submitted to arbitration in the near future. If the workers obtain anything further, it will mean that the reduction in the price of gas will have to be subject to this adjustment also. There is also the possibility of railway freights rising in the future. And, finally, it must be remembered that many undertakings make water gas as well as coal gas.

No reduction in the price of gas can be made until the next reading of the meter indices, which is due, however, to take place very shortly. In the past no increase in the price of gas followed the increases in the price of coal before the end of the quarters in which the increases were ordered, although the undertakings had to pay the enhanced prices immediately.

Nov. 27, 1919.

A Study of Asbestos.—In a concise and popular style, as free as possible from technicalities, Mr. A. Leonard Summers has written a small book on "Asbestos and the Asbestos Industry," which has been published as one of the "Common Commodities and Industries Series," by Messrs. Isaac Pitman and Sons. The book contains many illustrations, which emphasize the extraordinary variety of uses to which the peculiar properties of this mineral enable it to be put. Asbestos has, the author tells his readers, been found in almost all quarters of the globe; but the sole kinds hitherto found to be of any commercial value to the manufacturer are Italian, Canadian, Russian, and South African—the two former standing far superior to the others by reason of their most essential properties, infusibility, tensile strength, fineness, and elasticity. Italian asbestos, which is the best of all, contains nearly 80 p.ct. of silicate of magnesium and only about 3 p.ct. of oxide of iron. A new and important field of asbestos is, however, reported to exist in Western Spitzbergen.

PERSONAL.

THE RETIREMENT OF MR. A. F. BROWNE.

The best wishes of his many friends—that is to say, of all who know him—will follow Mr. A. F. Browne into his retirement from the service of the South Metropolitan Gas Company at the end of this year; and it will be hoped that such occasions as Association meetings (in which he has always taken a keen interest) will for many years to come afford opportunities for seeing and shaking hands with him again.

Mr. Browne has a long and useful record in connection with the gas industry, to the furthering of the general good of which he has devoted much of his time. With the South Metropolitan Gas Company he has been since 1873—first in the Chief Engineer's office and the laboratory, and then in charge of the Rotherhithe works, where he remained for seventeen years. He left Rotherhithe in 1899, to take up the position of Engineer at the Vauxhall works of the Company; and this position he retained for fifteen years—in fact, until the beginning of the war, when Mr. F. J. Bywater took up a Commission in the army, and the Directors gave Mr. Browne the control of the East Greenwich works. The opinion held by the Directors of the Company regarding his services has been inscribed upon a silver salver which was presented to him a few months ago by them, in words which must be a source of pride to him and those dear to him: "Presented to Mr. Augustus Frederick Browne by the Directors of the South Metropolitan Gas Company as a token of their esteem and in remembrance of many years devoted and unselfish service, included in which was his management of the East Greenwich works during the exceptionally difficult and anxious period of the great war." It is this devotion and unselfishness which have made him so many friends, both in the Company and outside.

As to his Association work, Mr. Browne was for a period of four years—from 1902 to 1905—a member of the Council of the Gas Institute; and he was for some years Hon. Secretary of the Southern Association of Gas Engineers and Managers, and President in 1895. He was also for the three years (1906 to 1908) Examiner in "Gas Engineering" to the City and Guilds of London Institute.

At their last meeting, the Directors of the South Metropolitan Gas Company appointed Mr. THOMAS CURR, Engineer of their East Greenwich station, in succession to Mr. F. J. BYWATER; and Mr. ARTHUR H. ANDREWS, Engineer of the Vauxhall works, in succession to Mr. A. F. BROWNE.

In connection with his retirement from the position of Engineer and General Manager of the Glasgow Corporation Gas Department, Mr. ALEXANDER WILSON has been presented by the officials in the various departments with a silver fruit service. Mr. W. Lackie (the City Electrical Engineer), in handing over the gift, paid tribute to the work of Mr. Wilson, during his thirty years' association with the gas department, for sixteen of which he had been Manager. He had done everything he possibly could in the interests both of the consumers and of the Corporation. Mr. Wilson expressed his gratitude to the subscribers, and pointed to the cordial relations which have always existed between the different officials.

With regard to the statement on p. 422 of last week's "JOURNAL" to the effect that the late Mr. GEORGE H. NIVEN, of Cleckheaton, had been, as Consulting Engineer, of great service in connection with the establishment of the new gas-works of the Spenborough Urban District Council, we understand that this is not correct. Mr. Niven had no connection with the establishment of these new gas-works, which were designed and built by Mr. ARTHUR L. JENNINGS, as Gas Engineer and Manager to the Spenborough Urban District Council.

Prof. PERCY FRANKLAND, F.R.S., formerly of the Chair of Chemistry at the University of Birmingham, has been awarded by the Council of the Royal Society the Davy Medal, in recognition of his extensive research work in chemistry. Prof. Frankland succeeded Prof. W. A. (now Sir William) Tilden as Professor of Chemistry at Mason College, Birmingham, in 1894, and subsequently became Dean of the Faculty of Science at the Birmingham University. During the war, he undertook a good deal of research work.

The engagement is announced of Captain R. G. M. NEWTON, Queen's Bays, only son of Brigadier General Marsdin Newton, Royal Bodyguard, and Mrs. Newton, to Naomi Winifred, only daughter of Mr. and Mrs. MAURICE GRAHAM, of 51, Albert Hall Mansions, Kensington Gore, S.W.

OBITUARY.

The death is announced, in his 77th year, of Mr. THOMAS CHAMBERS NEWTON, who a short time ago resigned the position of Chairman and Managing-Director of Messrs. Newton, Chambers, & Co. He had been a member of the firm for more than fifty years, but concerned himself more with the financial than with the technical side of the business.

ELECTRICITY SUPPLY MEMORANDA.

WHEN co-operation between gas and electricity undertakings is suggested, it is generally met with derision by a section of the electrical profession and writers in the electrical press. The mistake must not be made that co-operation in business is intended. There will always be competition between the two industries in every line; and merit must succeed. We are not so foolish as to think that for every purpose gas is the best. In every line of business along which gas extends, for some purposes it is far and away superior to electricity; and for other purposes the conditions of use are the determining factors as to which of the two competitors is the superior. This is not the attitude taken up by some electrical writers, who are so enthusiastic over the all-sufficiency of electricity that they encourage the opinion that the gas industry is on its last legs. They are the extremists in electrical faith; the more moderate ones know that our national system could not continue its development without the work that the gas industry performs, and that it and its products are as necessary as electricity is in its legitimate provinces. What stronger proof of this can be brought than that the Sheffield Corporation, with one of the cheapest electricity supplies in the North of England, are seeking power from Parliament in the next session to purchase the huge undertaking of the Sheffield Gas Company. However, apart from the secondary products of gas manufacture, no positive lines could be laid down to define for most purposes the boundaries of utility for gas and electricity. So there will always be competition, which, carried on fairly and squarely, must be beneficial. This being so, we cannot altogether agree with the remark of Lieut.-Col. Woodall in his Southern Association paper published in the "JOURNAL" last week that "what is eminently desirable is that present-day misunderstandings should be removed, and that, instead of competing with one another, we should join hands and pool our resources for the advancement of science and the benefit of our consumers."

Business Competition.

By all means join hands for the latter purposes; but competition there must be, in spite of pious hopes. Lest our electrical competitors should think Lieut.-Col. Woodall is the weak man suing for considerate treatment from the strong man, let us point out that he is the Engineer and General Manager of the Bournemouth Gas and Water Company, and that with 27,428 houses covered by the Company's mains, last January he had on his books 27,416 active consumers of gas for some purpose or purposes. And since January, apart from sales by ironmongers, and apparatus let on hire, his Company have sold outright £20,471 worth of gas-consuming goods, though prices are what they are, and though gas is at a price that has not been known in the area during the years within our memory. This is sufficient to indicate that Lieut.-Col. Woodall does not fear competition. His ultimate aim is economy; and he believes there is scope for beneficial co-operation between the two industries. He points to the direction when he says that "the bye-products of our works are more than ample to keep the ordinary town electric generating station provided." Provided with what? The fuel for generating electricity. There are many instances to-day of generating stations using coke for steam raising, either alone or in combination with coal. But this co-operation is not what the authors of the super-power station ideal want. Coal has to be conveyed to the local gas-works; and it is a convenient means of conveying and distributing the energy and other valuables the coal contains. The same conveyance from the coalfields would provide the fuel necessary for electricity generation, either as coke or (the coke being converted) as power gas. This would be a practical aid to coal conservation; but it is a matter the Government have missed. The reason of this is not very far to seek. The originators of the super-station scheme had in their minds the ideal of prefacing electricity generation by carbonizing the coal in bulk and selling the secondary products. If this was a feasible scheme, why should it not also be feasible for existing carbonizers of coal to supply precisely the same fuel for steam production? Moreover, to secure the success of the pre-carbonizing plan at the super-station, surplus gas and coke would have to be distributed about the country and sold, and other bye-products would have to be disposed of. And the increase of these bye-products by the carbonization of coal beyond what is actually necessary for the adequate service of the country would simply tend to create a glut, and a reduction in their market values. The carbonization business might therefore well prove for the electrical industry a drawback, instead of a help to more economical production. Before such a scheme is entered upon, there must be perfect assurance of good and profitable markets for all that is produced external to electricity.

The Junction of Co-Operation.

The rapid conversion on the old fittings, and without any screening, of the ordinary metallic filament lamp to the gas filled, or "half-watt," type of lamps is causing prolific writing in the electrical papers. It is a glaring danger; and the significance of it is not lost on electrical observers, who

The Electric Lamp Scandal.

think it prudent that this downhill course in unscientific and mischievous lighting should be stopped as near its initial stage as possible. There would be no objection to using the lamps if properly fitted and screened from the eyes. Those who are attacking this problem (which is a really serious one) are scattering blame about in almost all directions. Contractors and dealers in electric lamps are blamed. The shopkeeper is not blamed so much because he is, more or less, doing this evil innocently enough. Little or no blame is attached to the electricity suppliers; but we think that upon them lies the responsibility of taking quick action in warning shopkeepers of the necessity for shielding the lights. First steps in correction rest largely with them. It should be as much an offence against the law to use lamps that are injurious to the visual organs as it is to negligently put, or allow to remain, in the streets any obstruction which may occasion harm to limb. The "Electrician" thinks that a possible chance of action is afforded by the well-recognized distracting effect of these glaring lights on drivers of vehicles and their inconvenience to traffic. Alternatively, it might (our contemporary suggests) be possible for local authorities to frame regulations on the ground that this exposure of brilliant unscreened lights is a public nuisance. A writer in another electrical paper goes farther, and suggests that a law should be passed definitely prohibiting the use of these harmful high intrinsic brilliancy lights.

Two Views of the Amended Bill.

The electricity supply industry, if its views are represented by the "Electrical Times" and "Electrical Industries" has not yet made up its mind whether or not the Electricity Supply Bill, as amended by Standing Committee B., is going to be beneficial to it. The "Electrical Times" has received it with open arms. "Taken as a whole, the Bill is a Magna Charta for electric supply, and will profoundly affect every branch of the industry concerned in the generation or the use of electric energy." That is the voice of "Meteor." And this is the voice of the writer of an article in "Electrical Industries:" "There is little hope that the Bill as amended will be any more workable than when it was first introduced into Parliament. In certain respects the measure has been improved; but in others the amendments are indeterminate in character, and imperfectly correlated with each other. A rigorous process of revision must yet be undertaken to render the Bill coherent and to remove surviving injustices and uncertainties." At the time of writing, every nerve is being strained by a certain section of the House of Commons to secure the overthrow of the Bill, and this in the name of the electricity industry. But how hopeless their effort is seen by one happening. Both papers appeared pleased to learn that the Standing Committee had sent the Bill to the House with the clause struck out that was to sweep the electricity industry, its Electricity Commissioners, District Boards, or Joint District Authorities, and the whole bag of tricks into the care of the Ministry of Transport. Too early both papers rejoiced, and were exceeding glad. The very first thing the House did when the amended Bill came before it was to reinstate the clause, and so couple-up the electricity industry with transport. And what is more, the President of the Board of Trade favoured the transfer. One thing that surprises "Meteor" is that the progress of the Bill through Parliament arouses little interest except in electric supply circles—in fact, he finds the indifference "amazing." The fact of the matter is that the people were told that this scheme was going to have magical influence. They were then interested. Since then, they have found they were simply being bluffed, and that the former promise is not attainable. It is not the way of people to be pleased when they find they have been sold. [Subsequent to the writing of these notes, the Electricity Supply Bill had its third reading in the House of Commons. Various amendments have been made in it. One of these affects the gas industry. It will be seen by a paragraph on an earlier page of the "JOURNAL" that District Boards or Joint Authorities are prohibited from supplying forms of energy other than electricity in areas served by authorized undertakings without their consent, and on terms and conditions agreed upon.]

An Ugly Power.

There are some clauses in the Bill which the owners of the more imposing generating stations do not like, although "Meteor," who has not a generating station that is likely to be required, regards the Bill with such great affection and approval. Among the clauses that have general approbation is the one that applies to electricity the Conspiracy and Protection of Property Act, which makes it a penal offence to wilfully and maliciously break, in the case of gas and water, a contract of service. There is a great deal of bogey about the clause. It comes in very handy where a small number of men are involved; but in the case of a large number, it is not so easily applied in the event of a strike. It is no doubt very useful in putting the brake on a few impetuous spirits, who know that under the Act they may, if there is any infraction of the law, be hauled up, and have to pay the penalty of their want of fealty. In this particular connection, Lord Elveden, at the report stage of the Bill in the House, made a remark which has an importance about it that the Government has not realized. It was that, if all electrical undertakings are placed under one Ministry, a strike might not only interrupt the whole communications of the country, but also its industries. They would be absolutely in the hands of the men at the power stations. The Government are proposing to create a condition of things which would help considerably a labour upheaval conducted by federated unionism of the militant order.

Scheme Preparations—One for London.

There is activity among the municipal authorities in some areas in preparing initial schemes for Joint District Authorities—there being a decided preference for these than for District Boards, which would effect a more definite cleavage between electricity generators and distributors. There is likely to be a great deal of make-believe about the Joint Authorities and their work. With them the present conditions will be very much continued, with a few accessory arrangements here and there. Representatives of the London municipal undertakings have been jointly preparing a scheme. It is only in the rough; and rough with the worst possible meaning attached. The outline is crude and of indefinite form; but it has been sufficient to spur-up the Special Electric Supply Committee of the London County Council to ask for authority to confer with the representatives of local authorities owning electricity undertakings, with the view of taking the necessary steps in the matter of preparing a scheme. The London County Council appear to be afraid of being elbowed out of the electricity business, for the control of which they have for many years fought hard. The Electricity Commissioners are, according to the Bill, to have handed over to them the Council's powers in relation to electricity loans in London; and now the municipal authorities, in framing their preliminary scheme, do not seem to have taken the County Council into their deliberations. One feature of the scheme the municipal authorities think will suffice for London is that the existing generating stations should be developed to their utmost, and be interconnected for mutual support. They do not appear to contemplate the purchase of the existing stations—at any rate, not to any extent. Super-stations, too, are projects which may be left for a more convenient season, which may not come for many years, and perhaps never. The authorities prefer to let visions obstruct the way to the materialization of super-stations. They expect that some wonderful and rapid progress is going to be made; for we read: "If a big bulk supply station was put down immediately, it might happen that, with the advance of electrical science in the meantime, the new super-station would be dead before it was born." We are not particularly enamoured of super-stations in these times of high costs and political and economic uncertainty; and London is not the place, for military reasons, for such stations. The super-station, however, is an electrical ideal, and one which may prove very expensive. The authorities, in their scheme, seem to have no very amiable intentions towards the companies supplying electricity. They do not want them to have a place in the sun with themselves; an inferior position in the shadow will be quite good enough for those whose enterprise has led them into finding the money for electricity supply in the Metropolis. In the normal course, the companies would become statutorily extinct in 1931, and so the authorities think they might be allowed to die as pre-ordained. On the central controlling body, which the authorities propose should be formed on the lines of the Metropolitan Water Board, the companies would have no representation. Four Divisional Boards would be appointed to supervise electricity supply in their allotted areas; and on these the companies would be allowed representation. The area over which the companies concerned have distributing powers covers some 619 square miles; and their capital expenditure is approximately 20 millions sterling, compared with 11 millions in the case of borough electricity undertakings. The plan looks as though it will have to undergo substantial modification when the Electricity Commissioners come to consider the question of putting London on a proper electrical basis.

Importance of the Average Industrial Gas Consumer.

Attention was drawn by Mr. H. M. Crawford, in a paper presented by him at the recent annual convention of the Pacific Coast Gas Association, to the importance of the average consumer of gas for industrial purposes—the baker, the laundryman, the printer, the meat and fish people, and so on. Too much emphasis, he says, cannot be laid upon the fact that the true industrial field lies in the hands of the average industrial consumer, and not with the largest factories. The gas consumption of the small shops is not individually great; but they constitute the real backbone of the industrial gas business. The income from bakeries and other food-production places is steady twelve months in the year; and owing to their number, the diversity factor is good, and their business as a whole is secure. In the eagerness to secure individually large industrial business, one must not forget the value of these smaller ones. In order to substantiate the statement made that they occupy a place of great importance in the gas industry, it is necessary to know what revenue is received from industrial business, and how it is distributed. Recently a gas company on the Pacific Coast adopted a system of segregating and classifying that portion of the total gas revenue which could be attributed to industrial sales. For the first six months of this year, the industrial sale of gas was found to be 17½ p.ct. of the amount accounted for. The following is the classification of amounts reaching over 5 p.ct. of the industrial revenue: Restaurants, 27·2 p.ct.; shipbuilding, 9·85 p.ct.; hotels, 8·32 p.ct.; bakeries, 6·3 p.ct.; laundries, 6·25 p.ct.; and printing, 5·08 p.ct. Gas used for the preparation and production of foods constitutes altogether 53½ p.ct. of all the gas sold for industrial purposes.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Co-Operation Advocated between Gas and Electricity.

A somewhat unusual—though none the less enjoyable on this account—programme had been arranged for the meeting last Friday evening, at the Westminster Technical Institute, Vincent Square, S.W., of the London and Southern District Junior Gas Association; Major Philip Dawson, M.Inst.C.E., having promised to come and lecture to the members on the subject of "Electric Traction." This he did in a very informative manner, following up what he had to say by a fine collection of lantern slides, made-up of views of electric railways in many parts of the world. As was pointed out by the President (Mr. S. B. Chandler), the subject was one on which the lecturer can speak with high authority; for he is responsible for a large number of works dealing with electric traction. Among these are the electrification of the London, Brighton, and South Coast Railway; while he is now acting as expert in the same connection for the Great Eastern Railway, and is Vice-President of the Belgian Commission for electrifying the State Railways of that country.

Besides being thus a very busy man, Mr. Dawson showed himself to be a broad-minded one. He began by saying that the connection between his subject and the great industry in which his audience were engaged might not be apparent at first sight; but in reality electricity and gas are industries which could work, not only hand in hand, but mutually to their benefit and advantage. In the early days, when electricity was a very small baby, and the gas industry had reached its manhood, there might have been some question as to whether the new upstart, which was trying to encroach on the great field of lighting, might not eventually become a serious competitor, and he was afraid in those days many electrical people may have thought that at some time or other they would occupy the position of what they may have hoped would become a defunct industry. Any idea of this kind has, however, long years ago disappeared. Though there are some fields in which the two industries may be competitors, the competition is for the benefit of both. The enormous improvements in gas lighting which have taken, and are constantly taking, place may be attributed largely to the competition of electricity, which, in its turn, has been continuously improving the methods of lighting. But in future there should be no real competition between them; there should, in fact, be mutual assistance. Electric traction, at any rate so far as this country is concerned, is one of the greatest fields to which electricity can be applied.

Though this portion of the address was purely electrical, we may follow the lecturer for a moment or two into the history of electric traction. The first experiments took place as long ago as 1835, when Thomas Davenport made a model in which rotary motion was produced; and in 1842 Robert Davidson ran, on the Edinburgh and Glasgow Railway, a 6-ton truck, propelled by primary batteries. Then there was no further progress until the Vienna Exhibition in 1873, when the reversibility of the dynamo was discovered. This principle was practically applied by Messrs. Siemens and Halske at the Berlin Exhibition of 1879, with the use of track-rails as conductors. The first commercial application of the principle was attempted in 1881, when a short distance of an existing tramway in the neighbourhood was electrified. This was followed in 1883 by other schemes at Portrush and Brighton. The first application, however, on a really commercial scale took place a year later at Cleveland (Ohio), where overhead conductors were used. To-day there are many thousands of miles of electric tramways, all over the world. Whereas in 1892 in the United States there were 6000 miles of tramways and light railways, in 1918 there were 50,000 miles operated electrically. It was the success of the electric tramway which brought about the application of the principle to railways. The selection of any one of the various systems in use is purely due to financial considerations, including the three items of interest and sinking fund on capital, cost of maintenance, and cost of operation; and the cost of each of these items varies according to the service conditions.

Speaking of the results of electrification, Mr. Dawson said that on suburban systems, with very frequent as well as rapid services in thickly populated areas, electrification has universally proved successful, increasing the traffic, and under certain conditions reducing the working costs. In different cases the increase in traffics and receipts has varied from 50 to 100 p.ct. This gave some idea of the manner in which the public have appreciated the facilities afforded them. There is a saving in the number of locomotives where electricity replaces steam; and the cost of maintenance of the electric locomotives is much less. The saving in fuel for steam-generated electrical operation over steam-locomotives amounts to from one-half to two-thirds.

Both the gas industry and the electrical industry, proceeded the lecturer, have for their aim to get the very best they can out of coal. The question might arise of the higher efficiencies ruling with internal combustion engines; but here one comes up against capital expenditure, and unfortunately so far, taking everything into consideration financially, it has not been possible to get the very large units required. What is needed is a station of (say) 100,000 H.P.; and up to the present moment there seems to be no other means which have been practically demonstrated to be successful than steam-driven turbo-generators, utilizing high-pressure steam, and a considerable amount of super-heat. This calls for a very great quantity of condensing water. In a big power station, it is nothing unusual to consume at the rate of 1000 tons of coal a day; and this will require about 5 million gallons per hour of circulating water. To give some idea of the present consumption of electricity in this country, compared with the United States, he said the latest returns showed the figures to be 4500 million Board of Trade units in this country and 28,000 millions in America.

It is in relation to the generating of electric power that it seems to Mr. Dawson there is a great field where the gas and electric industries can co-operate. He sees no reason—and in this many of his friends agree with him—why, if they put their heads together, they should not be able to get the very best possible out of the coal. Each industry has its own work; but community of interest should render co-operation practicable. It appears to him that the greatest field of electricity is power, electro-chemistry, and electro-metallurgy. This is quite sufficient for anybody. There are people who suggest that electricity should be used everywhere—for heating, cooking, and all sorts of purposes. "It can be used for heating and cooking, no doubt," said the lecturer; "but taking my own experience, I have never used it for either, and am not proposing to do so. I am using a very large amount of gas; and it is giving me very good results." Gas, he went on to point out, has an enormous field for heating, and also for metallurgy, where in many cases gas is absolutely necessary. Even in the matter of lighting, he expressed the opinion that the high-pressure gas-lamps in Regent Street would be very hard to beat. "If we work together," he concluded, "we should be able to find means whereby we can co-operate for the better utilization of fuel. That is what we have to do for the good of this country."

After the pictures had been thrown upon the screen, there was some discussion of a conversational character, to which the President, Mr. J. G. Clark, Mr. L. Lacey, Mr. W. Grogono, Mr. James Hewett, and Mr. D. J. Winslow contributed. Mr. Clark asked about what would roughly be the limit to which a gas-engine could be used with financial success; whether the lecturer had considered the question of putting-up an electrical generating station near a gas-works, where there might be waste heat available which would be useful to the station; and whether he had considered the advisability of using coke under power-station boilers. Replying to these and other points, Mr. Dawson said that so far as he knows the largest gas-engine suitable for their purposes is somewhere in the neighbourhood of 2000 H.P. He explained the reasons why such large units are necessary for electrical work, and admitted that gas-engines give excellent results for smaller units. To both the other questions, he has given very careful attention. The possibility of electricity works being near gas-works was really in his mind when referring to co-operation. Coke mixed with coal is now being used, and giving excellent results. He has frequently given his attention, and is doing so still, to the possibilities of utilizing coke as it comes out of the retorts, so as not to waste any heat. There is no doubt in his mind that—though there are difficulties—this is a possibility, provided both industries put their heads together. In the United States, electrical engineers claim that there should be a saving of 66 p.ct. in fuel by electricity replacing steam for railway purposes. On an average, it would probably be quite safe to say that, where the load-factor justifies electrification, there should be a saving of certainly well over 50 p.ct. in fuel as compared with steam. As to omnibus and other road work, he expects to see the development of gas-producing plant which will be so light and so efficient that it will replace the petrol tanks certainly in the case of commercial vehicles.

In bringing the proceedings to a close, the President remarked that they must all have been struck by the broadness of the views on the subject of electricity to which Mr. Dawson had given expression. On the proposition of Mr. F. J. Pearce, seconded by Mr. Clark, a cordial vote of thanks was passed to Mr. Dawson, who, in reply, said he thought it was wonderful that such a large and appreciative audience should have assembled to listen to a lecture on a subject which at first sight must have appeared to them to be entirely disconnected from their industry. He hoped, however, that he might have succeeded in pointing out to them the intimate relationship which might be looked forward to in the future between gas and electricity.

NORTH OF ENGLAND GAS MANAGERS' (AUXILIARY) ASSOCIATION.

The Third Half-Yearly Auxiliary Meeting of the North of England Gas Managers' Association was held in the offices of the Sunderland Gas Company, on Saturday, the 22nd ult.—Mr. JOHN E. MORFETT, Distribution Superintendent to the Sunderland Gas Company, being in the chair. As mentioned in the "JOURNAL" a fortnight ago, these half-yearly meetings of the Junior members of the Association are open only to members and associates who are not eligible for the Special Purposes Section.

CHAIRMAN'S ADDRESS.

Mr. MORFETT delivered an address, in the course of which he said:

In the housing schemes which are springing up around us, much

scope should be found for gas. The class of people for which these houses are intended undoubtedly prefer gas to electricity; and local authorities have everything to gain by the general adoption of gas, as houses so equipped are more readily let and managed. Generally speaking, the apparatus should consist of gas for lighting, a gas-cooker, wash-boiler, and gas-fire in the sitting room or parlour.

In these days of high prices, it seems almost impossible to erect a five-roomed house for less than something in the neighbourhood of £950. The above apparatus should all be included in the price of the house, and a general maintenance scheme entered into for its systematic upkeep. In cases where a gas-heated domestic water supply is fitted, a small charge included in the rent should be provided for—the amount fixed according to the nature of the water, which varies considerably in the degrees of hardness in different parts of the country.

Industrial Unrest.

This is one of the most difficult problems to deal with, not only in our industry, but all over the country. In fact, it is pretty well world wide; and it should be one of the easiest to control. How this is to be finally solved, it is hard to conceive. There is one thing certain, while understandings and agreements can be made with the respective Labour leaders, there is nowadays no assurance that these will be carried out by the rank and file. This all hinges upon a want of confidence, not only between the employers and the employees, but between the men themselves and their respective leaders. Something must be done or created to bring about a better feeling. Whether this will be achieved by Industrial Councils or by a system of profit sharing, it is difficult to judge. It seems pretty clear that high wages are not the solution to it. During the past five years we have had perhaps the two extremes. However high wages are to-day, employers look not for a reduction in output, but rather the reverse; and no employer would object to pay reasonably high wages if he could but get a fair return for the wages paid. Careful record of works' costs should be prepared, so as to keep an eye on systematic slacking, and results brought before the men's representatives when necessary.

Government Power Scheme.

If the Government scheme of super-power stations for the supply of electricity comes into real existence, what is to be the position of the gas industry? If the price per unit is based on anything like a commercial proposition, and the scheme not subsidized, we have not so much to fear, as we can hold our own on the score of cost. It seems somewhat unfair for the Government to compete with undertakings such as gas companies, who obtain their statutory powers from Parliament. Why should one section of the community be so favoured, when both are doing good work in their respective capacities? It appears that the gas undertakings should receive encouragement, seeing that coal conservation is such an important matter, and that 75 p.ct. of the coal carbonized in gas-works reaches the consumers in the form of gas or coke, whereas only 17 p.ct. of coal converted into electricity reaches electricity consumers. Such an ambitious scheme surely has no foundation; and the gas industry must keep hammering away at the Government Departments until our rights are safeguarded.

Calorific Value, &c.

Recently we have almost become accustomed to quick changes. In my opinion at present, to change the calorific value of our gas to one of anything below 500 B.Th.U. is a mistake, knowing how particular consumers are to-day. In face of the coming competition with Government-aided schemes, it certainly warns one to supply the best possible, and not lose faith with consumers. A good and satisfactory service must always be our motto.

Whatever is the standard agreed upon, let it be constant, both as regards heating value and pressure. Let the consumer have as little worry with his apparatus as possible; and let it be cheap. The industrial load to day is of great value to gas undertakings, and must be encouraged. We cannot afford to sacrifice it at the expense of a low calorific value. I can hear someone say, If we can supply a low calorific value we can supply it cheap. But if we are forced into such a position, let us tread slowly.

Yet another change is contemplated and recommended by the Fuel Research Board—that is to charge for the gas supplied on the heat-unit basis. Gas must first of all be measured by meter in the ordinary way, and then multiplied by the B.Th.U. fixed possibly by the gas undertaking itself. Whether this is going to be to anybody's advantage, I am not yet convinced. One thing seems pretty certain. If we are to be allowed to fix our own standard, we shall have different standards all over the country; and apparatus made and adjusted to suit gas where the apparatus is made will not give the best results by any means in another town with gas of so many less B.Th.U.

Naphthalene.

Naphthalene still clings as close as ever to us, and is the cause of much anxiety from time to time. It seems almost as persistent and as difficult to deal with as some of the serious maladies of mankind; and those who come in contact with it in the district know what trouble it causes, and are looking forward to the day when we see practically the last of it.

Paint Spraying, &c.

The high cost of material and labour brings one to think of reducing the cost of production. When visiting to-day the Distribution Department of the Company, you will see what we have done in this direction. One of the latest introductions is a paint-spraying apparatus used for spraying with paint gas cookers and fires, meters, &c. This not only saves an enormous amount of time, but also in the amount of paint used. One quart of ordinary stove enamel will spray ten medium sized cookers, as against six similar cookers done by hand. The time occupied is three minutes per cooker with the spray, against 25 minutes by hand. The apparatus is simple and easy to manage. It consists of a small compressor, which delivers air to a receiver at 40 lbs. per square inch. A pipe is led from this to the spraying unit, where it is reduced to 5 lbs. per square inch. The paint is emitted, in the form of a very fine fog, from what is termed a pistol, and can be regulated at will by means of a trigger on the pistol held in the hand.

The same apparatus, with the addition of another pistol, is used for spraying the insides of gas-meters. Cooker tins and grids, quite unfit to go out on to the district again, are retinned, after being pickled in an acid bath, placed in a vat, and a coating of tin deposited on them by means of an electric current produced by a small dynamo. Adjoining this plant is a bath used for coppering purposes. Consumers' gas-fittings, or shop-soiled fittings from the show-rooms, and other articles are renovated and made like new, and any desired finish obtained. In addition to the plants named, there are ordinary pipe-screwing machines, polishing lathes, drilling machines, and turning lathes, &c.

Industrial Applications of Gas.

Now, briefly referring to the collection of articles manufactured by the aid of gas-heating operations in Sunderland. This, of course, does not include by any means a comprehensive selection, as some results of operations could not conveniently be brought here. For instance, a gun-metal liner of a propeller shaft, when shrunk-on to the shaft, would weigh many tons; and the same with the crank-pins of a marine engine.

The temperature employed with the samples shown varies from 200° Fahr. to 1350° C. The specimens include samples of glass polished and annealed by gas. The yearly consumption of one firm alone amounts to 44 million c.ft. Other samples include files, which are produced entirely with gas heating, including forging, annealing, hardening, and blueing. The brass for the castings shown is melted in gas-furnaces. Other samples are pickles, chocolates, toffee, burning names on ginger-beer bottle stoppers, chicory and coffee roasting, drying baking powder, glass mirrors, drying step stones, rivets used in marine boiler work, tool hardening, hardened cam shafts, &c.

Speaking of heating operations brings me again to a point on which I feel very strongly, and on which you, at a previous meeting, have heard me express my views—viz., that with all apparatus used gas-meters are required. It surprises me that in this twentieth century something more has not been done to reduce the size of the unwieldy gas meter. It is nearly time meter makers brought to light a meter which will pass the Sales of Gas Act approximating to something considerably less than half its present size. If the National Gas Council or the Institution of Gas Engineers were to take this matter in hand seriously, with the assistance of the gas-meter manufacturers, I am sure a solution would be arrived at. It is often difficult to find room for the larger-sized meters. Then the question of cost is a serious item, in addition to the apparatus to be used, whether for power or furnaces.

Looking broadly at our industry, we do not seem to do much to help ourselves, but rely upon makers of apparatus to bring new things forward. True, many of the ideas used in the manufacturing department and the apparatus used in the district result from the brains of someone connected with gas undertakings. But we want to bring ourselves more up to date, and quicker; and it seems to me if there was a department created and supported by the industry, to which ideas could be forwarded and there developed, it would be of immense value. From time to time requisitions could be sent out to all concerned, asking for information as to the need of new or improved instruments or apparatus.

Often good ideas lie dormant for the want of suitable tools to experiment with, or the means to put them on the market. For instance, a new and more efficient burner for lighting purposes is sadly needed at the present time; and an experimental department, as suggested, could no doubt perfect a detail like this, and be of great service to the country as a whole. Reward could be made to those who forward such ideas, preferably with models, that prove of value, either by those who undertake the manufacture or through the suggested department. This would often encourage those of an inventive turn of mind, and a wider sphere of usefulness would be given to inventive genius.

DISCUSSION.

Mr. J. F. Fowler (Newcastle) asked if the services had been examined to prove the presence of naphthalene or any other substance, and whether during the period any dust was found in the mains or services, or in consumers' fittings. With regard to paint-spraying, he noticed this apparatus was used for fires, cookers, and meters; and he asked as to the kind of nozzle or pistol employed for meter ename when spraying the meters. He also inquired the reason for reducing the air pressure from 40 lbs. to 5 lbs., and whether 5 lbs. pressure was used for spraying meters. With regard to a more efficient burner for lighting purposes, did this refer to business premises or private houses? If the latter, he rather disagreed, as he thought there was already a fairly efficient burner for house lighting.

Mr. H. J. SMITH (Shotley Bridge) said in 1914 he was employing gazine for naphthalene on the district, and later solvene. He used to get fair results; but since then he had found it necessary to use both, and at present was consuming two or three times the quantity.

Mr. H. TOWSLEY (South Shields) said, with regard to the question of naphthalene, they were at present having trouble. Sometimes whole districts were stopped owing to the mains being choked. They ordered an apparatus last May, but had not obtained delivery yet. They had a new plan—a wagon and vaporizer—and were going to vaporize benzol into spots (such as tunnels, arches, railway bridges, and sharp bends) where friction was set up and naphthalene deposited. He would like to hear Mr. Morfett's experience. Another trouble was rust and corrosion. At present, more services were choked with rust than naphthalene; and he inquired how this was treated. He quite agreed that a new burner for consumers' houses was required. Mr. Fowler referred to a particular burner; but he (Mr. Towsley) found it was no use in his district. It had a fixed air and fixed gas supply. Makers had not been able to supply them with a satisfactory burner or nozzle. Larger meters would be required to take the amount of gas necessary if a lower-grade gas was supplied. If they were going to give a gas of (say) 350 B.Th.U., it would mean greater initial expense, with larger mains, services, pipes to cookers, &c.

Mr. F. J. COLMAN (Sunderland) asked if the complaints were worse to-day than they were before the Company used to take out the crude benzol from the gas.

Mr. J. COOKE (Sunderland) enquired if it was definitely naphthalene or naphthalene and rust that was found, and whether there was most in steel, iron, or brass pipes.

Mr. O. H. INGHAM (South Shields) said Mr. Morfett had expressed his opinion that the standard calorific power ought not to be less than 500 B.Th.U. What was his reason? This was a very debatable point. Some considered it should be 350 B.Th.U., some 450 B.Th.U., and some 500 B.Th.U. There were a number of reasons and items—*e.g.*, size of mains and meters. If the standard was 350 B.Th.U., the consumers would require about 30 p.ct. more gas, and a larger size of pipes, thereby causing much expense. It meant that either existing mains would have to be renewed or higher pressures worked. If they had a low-grade gas, the meters would have to be increased for the quantity of gas passed. If a meter could be found to take up less room, it would be a great help. Another point was the suggested creation by the industry of a department for inventions. It would be interesting to have more details of this. If a committee could be formed to get ideas, it would be of great advantage.

Mr. W. J. WHYTE (Seaham Harbour) asked the members present if their naphthalene troubles were worse this year than before. In his experience, they were worse; and they were not caused by the change of coal, especially during the last two months.

The CHAIRMAN said the naphthalene trouble seemed to go round in cycles; and every year it seemed to get worse. Undoubtedly when examining the services and mains, the trouble had been naphthalene. They had had cases of rust in the fittings, also a deposit of grey powder. He was afraid the latter were getting worse, especially the black rust. They had had samples analyzed, and found prussian blue and ferric and ferrous oxide accounted for 64 p.ct. The outside temperatures were somewhat low during these epidemics. The spray was used more particularly for cookers, fires, and radiators. The meter enamel was rather difficult, owing to its consistency; a greater pressure being necessary. The same pressure was used for spraying meters with oil—viz., 40 lbs. Low-grade petrol was employed on the district for clearing mains. With regard to subways and other parts where difficulty arose, they had had a few cases on the district, and had overcome them by spraying low-grade petrol into the mains, and in this way had overcome the obstacles. They had not had trouble with rust in the mains to any extent. He thought the naphthalene complaints were worse to-day than prior to 1914. Steel pipes were chiefly used in high-pressure distribution in Sunderland. There was very little trouble with naphthalene in these pipes. Brass pipes were only employed in fixing gas-fires and small pieces of apparatus. He thought, in face of the present competition and that of the future, by the Government's offer to push electricity, that the standard should not be below 500 B.Th.U. This was the wrong time to trouble the consumer to regulate his apparatus. Regarding the suggested department for new ideas, some men had excellent ideas, but had not the money necessary to bring them forward. He thought that if a department was created to deal with these things and put them into a marketable condition, and then for them to receive the "hall mark" or "blessing" of the department, it would be a gain for all concerned. The details of such a scheme required a good deal of thought.

Mr. J. F. FOWLER (Newcastle), in proposing a vote of thanks to Mr. Morfett, said the idea of the auxiliary meetings was, so far as the Committee were concerned, to create greater enthusiasm and interest in their business and among the members. He was glad they were given the opportunity of a discussion.

Mr. W. E. OULDS (North Shields) seconded the vote.

Mr. MORFETT returned thanks for the kind way the members had received his address.

It was proposed by Mr. INGHAM (South Shields), and seconded by Mr. W. L. ROBERTSHAW (Sunderland), that the place and date for holding the next meeting be left in the hands of the Committee.

The members then paid a visit to the show-rooms and distribution department of the Sunderland Gas Company at Hind Street.

Masonic.

At last Wednesday's meeting of the Evening Star Lodge, No. 1719, Bro. A. C. Beal, Junior Warden, was elected Worshipful Master for the ensuing year, as the health of Bro. Corbett W. Woodall, Senior Warden, was not at present good enough to permit him to fill the office. It is hoped, however, that he will be able to go forward in 1920-21. W. Bro. Walter T. Dunn was re-elected Treasurer.

COKE-OVEN MANAGERS' ASSOCIATION.

(MIDLAND SECTION.)

The first meeting of the new session of the Midland Section of the Coke-Oven Managers' Association took place last Saturday at the Grand Hotel, Sheffield, when the newly-elected Chairman of the Section, Mr. J. A. DAVY, of Crigglestone, gave his inaugural address. The chair was occupied by Mr. J. A. LEE (Hasland), President of the Association as a whole, in the absence of the ex-Chairman of the Section (Mr. J. A. Wilson, of Staveley).

The CHAIRMAN, in opening the meeting, said Mr. Davy had always shown the greatest readiness to give his experiences for the benefit of his fellow members, and they were all glad he had been called to the chair. He believed the session just opening was going to be one of the most successful in the history of the Association.

Mr. DAVY then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—I thank you for the honour you have placed upon me by electing me as your Chairman for this session, and hope that, as an Association, we may have a very successful year. The Midland Section is without doubt flourishing, and is fulfilling the hopes raised by coke-oven managers when the idea of forming an Association was first broached, as the opportunities now given for meeting and discussion on the many points affecting our particular branch of trade are of great benefit to managers, and no doubt tend to greater all-round efficiency. We also obtain much valuable knowledge from the papers given from time to time, which were not available before the Association's inception, and the opportunities given of visiting various installations in our area; thus becoming conversant with the different types of ovens and methods of recovery, Again, we have the "Coke-Oven Manager's Year Book," which is certainly unique, as it contains much valuable information for our every-day needs. It is my desire, with the help of your Committee, to further popularize our meetings and visits.

I hope we may look forward to more settled conditions throughout the industrial world, as on this depends the measure of production, which is the crying need at the present time. In the coke-oven industry there is certainly a great demand for the various products manufactured—coke, sulphate of ammonia, benzol, tar products, and surplus gas. The combinations now formed for dealing with the sales of these products have certainly many advantages to offer, as the producer will benefit materially by being brought into direct touch with the consumsr; and with such control the transport of various products will be reduced to a minimum.

There is one point which struck me on my appointment as Chairman, and that is that two-thirds of our previous Chairmen have either left or are leaving this district. We wish them every success in their new sphere of labour, and hope they will benefit from the improvements and advantages which have induced them to go further afield. It is pleasing to know that several appointments on the newer installations have been given to members of our section, which I think shows good foresight on the part of the companies engaging them, as without doubt the area covered by this section is the most strenuous in the whole country for the coke-oven manager; the dirty coals with which we have to contend, and the high salt contents of them, with consequent troubles to oven walls, being much greater than in the majority of coke-oven plants in the country. This may not be the general experience of other districts. as we all certainly find sufficient peculiar troubles on our separate plants to keep us busy. But it is my candid opinion, having a fair knowledge of the working conditions in the various coking fields.

It has engaged my mind considerably as to what I could include in my address, to be of interest to you; and seeing that we have had so many communications on the chief products manufactured (ammonia, benzol, &c.), I eventually decided to read a short paper on pure naphthalene, which is a product we manufactured successfully at Crigglestone during the war period.

MANUFACTURE OF PURE NAPHTHALENE FROM COAL TAR.

We have a tar plant in connection with the coke-oven installation consisting of a battery of three 15-ton stills, with dehydrators, which are worked on day-shift only.

The following are the cuts during distillation:

	T.		
Ammonia liquor and light oil up to	1	at 60°	Fahr.
Carbolic in middle oil	7	at 100°	,,
Light creosote	9	at 120°	,,
Heavy creosote and anthracene	15	at 160°	,,

The respective yields of the different fractions are approximately:

	P.Ct.
Ammonia liquor and light oil	8
Carbolic in middle oil	12
Light creosote	10
Heavy creosote and anthracene	14
Pitch	56
	100

WORKING METHODS.

The oils are run into storage boiler tanks fitted with steam-coils. The pitch is run into a cooling tank, and from this into the pitch bay.

Practically all the naphthalene is present in the carbolic and light creosote oils, which represent about 20 to 25 p.ct. of the tar distilled. These two oils are washed for carbolic and cresylic acids before treatment for the removal of naphthalene, owing to the acids keeping the napthalene in suspension; and by extraction we get a better yield of naphthalene. The oil, being now free of carbolic acid, is run into the cooling plant. This plant consists of a series of tanks very suitably constructed for atmospheric cooling—being 10 ft. by 2 ft. 6 in. by 4 ft. 6 in. deep, with a channel 6 in. by 6 in. along the whole length of the bottom. A plug valve and spindle are fitted for discharging the drained oil. All drains are connected to one ground collecting tank and pumped from there to the loading tank. The time required for cooling is generally 48 hours, but varies slightly according to atmospheric conditions. When cooled, the plug-valves are lifted, and all the remaining oil drained-off, after which the naphthalene salts are dug-out of the tanks and transferred to a steam-heated melting boiler tank.

When sufficient tonnage has accumulated, a 12-ton still is charged by means of compressed air. This still is similar in design to an ordinary tar-still, and is fitted with a small fractionating column. It is gas-fired; and the distillation is carried on until the final distillate coming over contains too much oil for naphthalene to settle out. The naphthalene distilled is collected in ordinary galvanized buckets. This method is adopted on account of the convenience in handling and quick cooling, thereby also giving large crystal flakes, which are necessary for the successful operation of the next stage in the process. The "bucket" naphthalene thus obtained contains on an average 25 to 30 p.ct. of oil, with a solidifying point 67° to 68° C. The residue left in the still, after standing for cooling, is run off to the rough oil storage tank. In order to remove the large amount of oil present in the bucket naphthalene, this product is broken-up by means of a mechanical breaker, and fed into the hydraulic press, where it is subjected to a pressure of from 35 cwt. up to 2 tons per square inch.

This gives a product termed pressed naphthalene—an average test showing that it contains less than 1 p.ct. of oil, with a solidifying point of 76·5° to 77·5° C. In this process it is necessary to have a good flake crystal naphthalene, and also to keep a fairly constant temperature in the hydraulic press. For this purpose the press is steam jacketed; otherwise with the temperature low, as in winter months, the solidifying point is lowered, owing to the oil not being removed, though the pressure is kept up to 2 tons per square inch.

This pressed naphthalene is then transferred to another re-melting boiler, and when re-melted is blown by compressed air into the washer. This consists of the usual shaped wrought-iron vessel, as employed in benzol washing. It is lead-lined, and a further lining of acid resisting bricks has been fitted. The latter lining is necessary for two reasons: (1) It acts as a protection to the lead lining during the washing with hot concentrated sulphuric acid; (2) a large amount of steam is saved, to keep the naphthalene liquid. The washer is fitted with a lead steam-coil laid all around the conical-shaped bottom. The agitating arrangement is of the usual centrifugal type; the shaft being of mild steel, and the impeller of cast iron.

The melted pressed naphthalene is now washed with 6 p.ct. by volume of D.O.V., agitated for one hour, and then allowed to stand for a quarter of an hour. The acid layer is then run off, and the naphthalene further washed with 4 p.ct. (by volume) of D.O.V.—being agitated and allowed to stand for the same time as before. After removing the acid as completely as possible, 6 p.ct. (by volume) of 30° Twaddel caustic soda is added, and the whole agitated for one hour, then allowed to stand for a quarter of an hour. The alkaline is run off and the operation repeated, using however 4 p.ct. (by volume) of caustic soda. The soda layer is carefully run off, and then a wash is made with water which has been weighted with sodium sulphate; the period of agitation and standing being the same as in the previous operations. The sodium sulphate is added to make the aqueous layer settle below the naphthalene, owing to the specific gravity of the naphthalene of 80° C. being ·984, and water at same temperature ·972. After running-off the aqueous layer, and after testing the naphthalene to ascertain if sufficiently washed, the naphthalene is run off into a boiler storage tank, which is fitted with a steam-coil and is large enough to hold a charge for the final still.

The method of testing is carried out in the following manner: Of the sample, 100 grams are placed in an 8-oz. retort, and distilled until 80 p.ct. has distilled over. The distillate is then tested as follows: (1) Solidifying point. (2) Sulphuric acid colour test. (3) Nitric acid colour test. These tests are:

Solidifying Point.—About 50 grams of the distillate are placed in a small enamel dish, and heated at as low a temperature as possible until liquid. It is then stirred with a thermometer graduated in 1-5th° C. until it begins to crystallize. The temperature at this point rises slightly, and then remains constant for some time. The temperature shown is the solidifying point.

Sulphuric Acid Colour Test.—1 gram of the distillate is powdered and placed in a dry test tube, and 10 cc. of pure concentrated sulphuric acid added. The mixture is warmed until the naphthalene dissolves. If the washing is satisfactory, the colour will be light pink; if unsatisfactory, it will be red or even black.

Nitric Acid Test.—This test is used in order to ascertain the liability of the sample to change colour when exposed to light, as impure naphthalene turns pink on exposure to light.

The test is as follows: A few cc.'s of pure nitric acid (free from nitrous acid) are poured into the bottom of a desiccator, and the naphthalene to be tested is suspended over the nitric acid on a watch glass, and the desiccator lid put on. If the naphthalene is satisfactory, it will not turn pink inside half an hour.

The washed naphthalene is now blown by means of compressed air into the final still, which is similar in design to the stills previously mentioned. The distillation is carried on until the product begins to change to a brownish colour. The amount distilled over averages about 80 p.ct. of the charge. The naphthalene is collected in galvanized iron buckets, and allowed to cool overnight. It is then passed through a mechanical breaker and fed into a "Kek" grinder, which gives a fine powdered quality similar to flour. Another method of cooling adopted is to allow the liquid naphthalene direct from the still to run on to a revolving drum, through which cold water is circulated. The naphthalene flows into a trough in which the drum revolves, and forms a film on the drum, which is removed by a knife-edge scraper, giving a granulated product, or, if necessary, fed into the "Kek" grinder for the powdered product. Either quality is now ready for sale, and is packed into casks or bags.

The residue left in the sttll is allowed to cool and then run off into the boiler in which the crude salts are melted, and again passed through the whole process.

The pure naphthalene obtained by this process fulfils all specifications, and gives the following tests:

Average Sample.

Melting point	79·5 to 79·7° C.
Solidifying point	78·8 to 79° C.
Sulphuric acid	pale pink.
Nitric acid	one hour without turning pink.
Phenols	none present.

The yield of the finished product obtained from crude salts is 40 to 45 p.ct.

There was a very urgent demand for pure naphthalene during the war, and it was owing to this that we embarked on the manufacture of the product. Since the armistice, however, the demand has fallen away considerably.

DISCUSSION.

Mr. GEO CHRISP (Silverwood), Past-President, in moving a vote of thanks to Mr. Davy, asked how did the price of the finished product work out in comparison with the price of the raw product, *plus* expenses of manufacture in labour and chemicals.

Mr. DAVY said the price to-day of the finished product was £17 per ton, and crude salts cost about £5 at the works. He would not manufacture at to-day's prices; but he would be prepared to renew it at £2 advance on the £17. During the war period, of course, when the market was very good, the price went up to £30; but the labour market and tar products were not at to-day's prices.

Mr. CHRISP said this meant that they had to have a very big figure for the pure naphthalene before manufacturing. Mr. Davy had touched on a subject which had been rather neglected; and those of the members who were tar distillers would appreciate the paper very highly. To him, the manufacture of pure naphthalene was something of a puzzle; and he would look forward to reading the paper more closely in the Technical Press.

Mr. B. WILSON HAIGH (Barnsley Main) asked if there was any risk in the condensing material. They all knew how bad naphthalene was for salting-up pipes, &c. Did Mr. Davy find he had any serious extent of coils blocking-up, &c.?

Mr. DAVY replied in the negative. The melting-point of naphthalene (79°) was very small. As to the off-take from the still, it was necessary to have it steam jacketed, or a steam-pipe running through. He had had no blow-ups. If one had a very long length, one would need an inserted steam-pipe—the cheapest method. In reply to a question as to what length it could be conveyed, he said it was being conveyed on the plant under consideration from 40 to 50 yards—anywhere round the plant practically. This was as far as one would want to convey it.

Mr. FLEMING remarked that Mr. Davy gave a yield of 35 p.ct. of pure product as compared with the crude product. Could he give any idea of the composition of the oils pressed-out from the naphthalene, and whether there was any difficulty in disposing of the oil. It would be interesting also to have the figure for loss due to washing, and to know the form of condenser used in the distillation.

Mr. DAVY replied that the oil was creosote, suitable for benzol washing. He had not the actual figure of the wash, but it was small. He used an ordinary water-tube coil-condenser. The condenser was arranged in the tank. They had taken up the work by Government request; and the Ministry had promised him a visit to some plant on such work. Most of the work, however, was being dealt with by the French and Italian people, and there were only one or two plants in England. The visit had not been found possible; and he had had to manage without. They got through at the finish, although he admitted that he had not told the meeting all his troubles in the paper.

Mr. F. WHITE seconded the vote of thanks; and it was adopted.

PROGRAMME FOR THE WINTER SEASON.

The meeting then resolved itself into an ordinary business meeting, Mr. DAVY assuming the chair.

The HON. SECRETARY of the Section (Mr. Gerald H. Lant) stated that the Committee had managed to fill every month during the winter season by the kindness of gentlemen who had promised to give papers, with the exception of one month, in regard to which it was suggested that this should be a question meeting.

Mr. LEE said the idea of the Committee was that members who cared to do so should submit a written question in advance, and the

Committee would endeavour to arrange that an answer should be given by somebody who specialized in each subject raised, and the matters would then be open for general discussion.

Mr. W. GREEN asked if the programme included any paper on labour problems and political economy, as had been suggested in the course of the speeches after the annual dinner. This was an increasingly important side of their work; and he thought they ought to have some idealist in the Association who could deal with it as it affected the coking industry.

The CHAIRMAN said he thought it was a matter which might very well be dealt with at the question meeting. There was no such paper on the programme.

It was agreed that the proposed question meeting should be held in February.

The following arrangements were made for the coming winter's meetings: Dec. 20, at Sheffield—Mr. T. B. Smith (Stocksbridge) on "Some Technical Problems of the Future;" Jan. 31, at Sheffield—Mr. Reece, of the Research Staff of Sheffield University, on "Coke-Oven Bricks and Refractories;" Feb. 28, at Barnsley—Question meeting; March 27, at Sheffield—Mr. J. T. Price (Redbourn Hill) on "Modern Coking Plant;" April 24, at Chesterfield—Mr. J. W. Lee, address to the Section as President of the Association, and probably an inspection of the Hasland plant, which had had to be abandoned during the past session owing to the strike difficulties.

Mr. LANT announced that arrangements were practically complete for visits to works for all the summer months except June and July; and two plants were proposed to be written to, asking permission for a visit.

NORTHERN SECTION.

As Chairman of the Northern Section of the Association, Mr. J. W. Porteous last Saturday week delivered his address at a meeting held at Durham. Speaking of bye-product coking practice, he said that on plants where coal with a large percentage of moisture was used, there were more naphthalene troubles than where dry coal was used. Moisture up to 9 p.ct. undoubtedly improved the yield of ammonia—it helped to protect it in the oven—but when above 9 p.ct., he thought he was on sound ground in saying the yield of ammonia had a tendency to fall. Too large a percentage of water also affected the coke yield. Another enemy of the coke-oven manager was ash, which was injurious to the yield of ammonia, not only because of the place it occupied in the oven, instead of clean coal, but also from the fact that when the ash contained a certain amount of iron in an oxidized state, or even as pyrites, the iron acted upon the already formed ammonia; and by catalytic action, at temperatures of (say) 600° and upwards, destroyed a large amount of ammonia already formed when it came into contact with it.

ILLUMINATION DEVELOPMENTS.

It was a mixed bill of fare that was given to the members at the meeting of the Illuminating Engineering Society last Tuesday, meeting at the Royal Society of Arts. After the formal business, the first item of interest carried the large audience present a couple of centuries ago, by the President (Mr. A. P. Trotter) telling of Lambert's connection with the early history of photometry. Some part of what he said is given in another column.

PROGRESS.

Mr. L. GASTER, the Hon. Secretary, then gave an account of progress during the vacation. He said the arrangements whereby the Presidents of the Institutions of Gas and Electrical Engineers become Vice-Presidents and members of Council during their tenure of office had now been extended to a number of other bodies; and the Institutions whose acting Presidents become members of Council were now: The Illuminating Engineering Society in the United States, the Illuminating Engineering Society in Japan, the Institution of Gas Engineers, the Institution of Electrical Engineers, the Council of British Ophthalmologists, the Ophthalmological Society, the Physiological Society, the Electrical Contractors Association, and the Association of Railway Electrical and Telegraph Engineers. The co-operation of these various bodies would doubtless be most helpful in dealing with problems of mutual interest, and it would afford a recognition of the standing of the Society and its impartial mode of work. The National Illumination Committee had, he said, now resumed its work; the Chairman being the President of the Illuminating Engineering Society, while its Hon. Secretary is one of the two representatives on the Executive Committee of the International Commission on Illumination. There was much useful work awaiting the Committee; and it was to be hoped that international consideration of these problems would now be resumed. During the vacation, the Society had been actively engaged through its various Committees. Three of the new Committees had now been provisionally constituted, and had commenced work—viz., those on Progress in Lamps and Lighting Appliances, Eye-Strain in Cinemas, and Railway Lighting. The Joint Committee on Railway Lighting was constituted by Lieut.-Col. F. A. Cortez Leigh (London and North Western Railway), Chairman, Mr. J. S. Dow, Mr. L. Gaster, Mr. F. W. Goodenough (Gas Light and Coke Company), Mr. A. Stokes (South Metropolitan Gas Company), Mr. A. Cunnington (London and South Western Railway), Secretary. The following had also consented to act on the Committee: Mr. Roger T. Smith (Great Western Railway), Mr. W. Wood (North British Railway), Mr. A. R. Cooper (Underground Railways), and Mr. W. S. Goodchild (Gas Engineer of the Midland Railway). It was hoped that now that the distractions of the war were at an end, the Departmental (Home Office) Committee on Lighting in Factories and Workshops would shortly be resumed, and that in the near future its recommendation, that definite requirements as regards industrial lighting should be introduced into the Factory Acts, would be carried into effect. The matter would doubtless come up for consideration in other countries. The moment seemed to be opportune for treating industrial lighting on a common basis by the chief nations of Europe.

ELECTRIC LAMPS AND LIGHTING FITTINGS.

Mr. J. W. ELLIOTT, Secretary of the Committee on Progress in Lamps and Lighting Appliances, gave an account of the metal filament lamp and fittings industry at the present time; and it was not without interest for the competitors of electricity in the lighting field. He stated that, more normal conditions now obtaining, the production of metallic filament lamps in this country was now about equal to the consumption. As to bulbs, the situation was still unsatisfactory; and a certain number had to be imported. It was considered, however, that in the near future the whole of the demands for bulbs and glass would be met by home production—largely due to the adoption of automatic machinery for making bulbs and glass tubes. Adequate supplies of argon were now available; this being necessary for the manufacture of the lower wattages of the gas-filled lamps. A reduction of approximately 20 p.ct. had been made in the price of gas-filled lamps; and as soon as manufacturing facilities permitted, there was no doubt a reduction would be made in other types. With reference to the supply of suitable fittings scientifically designed, it was admitted that the situation had not been satisfactory; and this was particularly the case in regard to fittings for use in conjunction with gas-filled lamps. Since the armistice, however, most of the leading manufacturers had been engaged on the designing and manufacture of suitable lanterns for use with these lamps. One of the great difficulties, however, had been to obtain the necessary globes. So far the supply of English-made globes had been entirely inadequate to meet demands; and it had therefore been found necessary to import a certain number. During the year, smaller sizes of half-watt type lamps had come into general use; and it was regretted that at the present time there was not a supply of scientific fittings or reflectors suitable for use therewith. The matter was, however, engaging the attention of the leading manufacturers. Mr. Elliott showed a set of curves illustrating the annual demand for each candle power, both vacuum type and gas-filled, for the past five years; also a set of curves illustrating the average annual candle power demand. From these it is seen that the demand for higher candle-power units of ordinary lamps is on the increase. Mr. Elliott thought it probable that a 60-candle power half-watt lamp would be the most favoured for general purposes. He spoke strongly against the blinding glare of the gas-filled lamp in shop windows, and its misuse generally. This was a matter that illuminating engineers should promptly take up. The manufacturers are giving attention to the matter; and a gas-filled lamp in opal bulb was shown as one proposition for obscuring the glare, and getting a better diffusion of light. [This means that the lighting efficiency must be sacrificed to secure safety for the organs of vision.]

RAILWAY LIGHTING.

Lieut.-Col. CORTEZ LEIGH stated that, in connection with the Committee on Railway Lighting, the list of members given by Mr. Gaster showed that they had endeavoured to get experts on the Committee dealing with various forms of illuminants. They had representatives of the gas and electric lighting interests, as well as scientific observers. A Sub-Committee had been appointed to deal with the procedure for obtaining data which were necessary before one could arrive at standards for the different forms of lighting. They had such a variety of lighting with which to deal—station and platform lighting, offices, yards, goods yards, signal boxes, and railway carriage lighting. The problems were very complex; and so they must have experts on the different kinds of lighting. They were endeavouring to obtain one or two oil experts. The Committee had held their first meeting to decide upon a basis for obtaining information on which they should proceed to standardize. Their object would be to arrive at what they considered to be ample commercial lighting. He hoped the Committee would be able to determine definite standards which would be adopted not only in this country, but in others. There would, however, have to be patience, as the inquiry would necessarily have to be a large one.

CORRECTING LIGHTS FOR COLOUR MATCHING.

Mr. L. C. MARTIN, Lecturer in the Technical Optics Department of the Imperial College of Science and Technology, then gave a demonstration of the "Sheringham Daylight." To obtain artificial light which will permit of colour matching or determination, use is made of a coloured reflector for correcting the distribution of energy in the spectrum of the artificial source. It was originally founded on the invention of Mr. George Sheringham, the well-known artist, who used simple coloured reflectors or shades with artificial sources, and found the quality of the light for painting immensely improved. The possibilities of the system have been to some extent worked-out by Mr. Martin; the requisite distribution of colours being calculated on spectro-photometric

measurements on opaque pigments made by means of Abney's colour-patch apparatus. It is necessary in general to make use of arrangements to reflect the whole of the light from the coloured surface—thus producing a type of indirect lighting unit which should have great possibilities in connection with shop window lighting and many other commercial and industrial uses. It is hoped to make the lamp the subject of a communication to the Society in the near future; and an exhibition of this and certain modified units is also to be held. On this occasion Mr. Martin showed two forms of the reflector in use with a number of different coloured fabrics beneath. He alternated the reflectors with white ones; and there was a marked difference in the tints.

THE "POINTOLITE" ELECTRIC LAMP AND AN ILLUMINATION PHOTOMETER.

Then Mr. P. Freedman, of the Ediswan Lamp Laboratory, gave a demonstration with the electric "Pointolite" lamp in various forms for different special purposes; and afterwards Mr. Haydn T. Harrison described a development of an illumination photometer for cinema illumination measurements.

THE COKING OF ILLINOIS COAL IN OVENS OF THE KOPPERS' TYPE.

The November number of the "Journal of the Franklin Institute of Philadelphia" contained the following abstract of a joint report made by Messrs. R. S. M'Bride and W. A. Selvig, to the American National Bureau of Standards and the Bureau of Mines, on an "Operating Test at the St. Paul Plant of the Minnesota Bye-Product Coke Company."

The great importance during the war period of substituting Mid-Continent coal for coals from more distant sources—even in bye-product coke-oven work—was well recognized. The Bureau of Standards was ordered to conduct an investigation of a new coke-oven process claimed to be especially suited to this purpose; and in connection with this the bureau was requested to conduct a test of the St. Paul plant of the Minnesota Bye-Product Coke Company, which is owned by the Koppers Company of Pittsburgh. The Bureau of Standards, in co-operation with the Bureau of Mines, carried out this operating test—using about 7600 tons of coal from the Orient Mine, Franklin County, Illinois. All phases of coal-handling, bye-product recovery, and laboratory tests, were under observation by the staff of thirty-seven Government engineers and chemists employed on the work. In addition, those in charge had the benefit of advice and comment from a considerable number of experts who are specialists in the field of coke-oven operation.

The quantity of all coal used and of all bye-products obtained was carefully weighed or else measured at regular intervals, and samples of each material were taken for analysis. The Bureau of Standards was responsible for the general planning and supervision of the test-work. Its representatives made all observations of battery operation, high temperature measurements, bye-product recovery, and chemical laboratory work on gas and bye-products. The Bureau of Mines was responsible for the sampling of the coal, both as it was loaded at the mine and as dumped at the plant. It supervised the weighing, coal-handling, coke-handling, and coke-sampling operations, and made all analyses of the coal and coke. Its representatives also made general observations on the character of the coke and the operation of the ovens.

The Minnesota Bye-Product Coke Company's plant consisted of 65 ovens of 18¼ in. average width, operating during the test period with an average gross coking time of 19 hrs. 33 min., with coal finely pulverized, 12·75 tons per oven as charged. The temperature of the heating wall, as determined by rare metal thermocouples, averaged about 1200° during the test period. The coke was screened to produce large and small furnace sizes, stove, nut, and pea, domestic sizes, and breeze. The gas was separated into rich and lean at the battery. Separate test records were kept of each size of coke and of each quality of gas. Practically, all the ammonia produced was made into sulphate immediately through the direct recovery process. Although the plant operated for the production of pure light oil products only the total production of light oil was measured; but the yield of various constituents was determined by analysis.

The coke produced was very irregular in size, had a longitudinal fracture, was fingery, brittle, and shattered very easily. The cell structure was small and regular. The coke was lighter than the average bye-product coke, weighing only 23 lbs. per cubic foot. The first table further summarizes the characteristics and yield of this coke. The large percentage of domestic sizes obtained, and therefore the unusually small percentage of furnace size demonstrates that the coke will not stand handling and screening without breaking-up into many smaller sizes. This is due primarily to its fingery and brittle characteristics.

In order to test the behaviour of the furnace-size coke produced from the Orient coal, arrangements were made to use about 1800 tons of the material in the blast-furnace plant of the Mississippi Valley Iron Company. The coke regularly used in the furnace is produced in Koppers ovens of the Laclede Gaslight Company, St. Louis, from a mixture of Elkhorn, Pocahontas (low volatile), and Illinois coals. The substitution of the Illinois coke for the regular supply was accomplished abruptly, and continued without interruption throughout the ten-day period. Several experts were present during the test; and it was the unanimous opinion of these persons, and of the blast-furnace operators, that the Illinois coke had shown highly satisfactory results. However, it should be borne in mind that the furnace used for the test was of small capacity; and it is not certain, therefore, that the results in this case would be duplicated on a large-size furnace.

The yields of gas and bye-products are summarized in the second table.

As a result of the test, it is clearly demonstrated that some of the Illinois coals can be coked in the Koppers-type oven without radical change in the operating methods for the production of coke which can be successfully used in a blast-furnace. However, it appears that the temperature at which Illinois coal should be handled for the production of the best coke is somewhat lower than the best operating temperatures for Eastern coals; and, moreover, the speed of coking of the Illinois coal is somewhat less. The yield of gas and bye-products from the Illinois coal of the kind tested is excellent both in quantity and quality. Of course, the coal tested represents one of the best Illinois coals for coking purposes—being lower in ash and sulphur, and otherwise superior to many from this field.

In general the comparison of Eastern coking-coals with those from the Mid-Continent field must be made upon an economic basis, since which source will be preferable depends altogether on local conditions which will affect the cost of the material and the relative expense of handling. These phases of the question have, however, not been discussed in this report.

Gas and Bye-Product Yield Summary.

Product.		Per Ton of Coal. As Charged.		Dry.
Gas:				
Surplus	c.ft.	5,490	..	5,970
To ovens	,,	5,230	..	5,690
Total	,,	10,720	..	11,660
Tar:				
As produced	gallons	7·81	..	8·49
Dry (computed)	,,	7·57	..	8·23
Ammonium sulphate—pure	lbs.	27·88	..	30·33
Ammonia	,,	7·19	..	7·82
Light oil:				
As produced	gallons	3·71	..	4·03
Under 200° C.	,,	3·11	..	3·38
Benzene	,,	2·105	..	2·289
Toluene	,,	0·497	..	0·540
Solvent naphtha	,,	0·130	..	0·141

Coal and Coke Summary.

Coal Used.

As charged	7685·6 tons
Dry	7065·4 ,,
Oven charged	603 ,,

Coal per Oven.

As charged	12·75 tons
Dry	11·72 ,,

Coking Time.

Average gross	19 hr. 33 min.
Average net	19 ,, 11 ,,

Coke Produced (Dry).

Furnace	2704·4 tons
Stove	1178·1 ,,
Nut	549·5 ,,
Pea	89·9 ,,
Breeze	308·4 ,,
Total	4830·3 tons

Ratio of Dry Coke to Dry Coal.

Furnace	38·3 p.ct.
Stove	16·7 ,,
Nut	7·7 ,,
Pea	1·3 ,,
Breeze	4·4 ,,
Total	68·4 p.ct.

Sizes of Coke Produced.

Furnace	56·0 p.ct.	Pea	1·8 p.ct.
Stove	24·4 ,,	Breeze	6·4 ,,
Nut	11·4 ,,	Total	100·0 p.ct.

Midland Junior Gas Association.—At a meeting of this Association in the Council House, Birmingham, on Thursday evening, a paper on the "Effect of 'Inerts' upon the Thermal Efficiency in the Use of Coal Gas" will be read by Mr. J. W. Wood, M.Sc., Research Chemist, Fuel Department, Leeds University.

Irish Coal for Gas Production.—During the sittings in Dublin of the Irish Coal Industry Committee, appointed by the Government to inquire into the resources and development of the Irish mines, Mr. Frank Browne (the Manager of the Sligo Gas-Works) gave evidence "with regard to certain West of Ireland mines and transport of bye-products. He had, he said, only used small quantities of the coal; but the results were very satisfactory. Mr. A. R. M'Clure testified to the qualities of other Irish coal for gas-producing purposes.

Mr. Doig Gibb's Burnley Report.—Mr. W. Doig Gibb, who was asked by the Burnley Town Council to conduct an inquiry into the affairs of the Gas Department, has completed his investigations. Owing to illness, he was unable to finish his report for the last Committee meeting; but he has since forwarded a letter to the Town Council in which he states that his report will not adversely criticize the undertaking or its management. He says: "I have got all the investigation work finished; but I have not been able to complete the report itself in time. I hope to let you have it within a few days. In the circumstances, I may be allowed to say that my report will not adversely criticize your gas undertaking or its management, and that therefore no bad effect can possibly result from the slight delay in its presentation.

SCOTTISH JUNIOR GAS ASSOCIATION.

(WESTERN DISTRICT.)

The Scottish Junior Gas Association (Western District) held their second meeting of the session in the Royal Technical College, Glasgow, last Saturday week—Mr. JAMES DICKSON (the President) in the chair.

The PRESIDENT, in opening the proceedings, referred to the death of Mr. George Scott, of Glasgow, who, as an ordinary member, had taken keen interest in the work of the Association for a number of years.

HONORARY MEMBERS.

The PRESIDENT next intimated that the Council had unanimously decided to increase the list of honorary members of the Association; and to this end they proposed to raise to honorary membership the following ordinary members: Messrs. James M'Ghee, George H. M'Cowat, and A. H. Whitelaw, of Glasgow, Mr. John Wilson, of Motherwell, Mr. Thomas Carmichael, of Portsmouth, and Mr. David Fulton, of Helensburgh.

The meeting unanimously approved the Council's decision.

Mr. JAMES S. M'NICOL (Dawsholm) then read the following paper:

WATER GAS.

After a year's work with the water-gas plant at the Temple works of the Glasgow Corporation, a few words about the small matters which cropped-up in the working may be of interest.

DESCRIPTION OF PLANT.

For the benefit of those who have not seen it, I will first of all give a brief description of the installation, which consists of three complete sets of Humphreys and Glasgow's carburetted water-gas plant capable of producing 3 million cubic feet of purified 16-candle power gas per day; using about 2¼ gallons of oil per 1000 c.ft. when first quality of well-forked coke is supplied. Each set comprises a 6 ft. generator, carburettor, superheater, washer, and coal-pot. On the platform, there is the usual reverse coke apparatus for up-and-down running; steam-valves and steam-meters showing pounds of steam passing per minute; also air-blasts to the generator, carburettor, and superheater. On the top of the latter is the stack-valve. The whole apparatus is fitted with safety interlocking gear—thus rendering the plant practically fool-proof. Facing each gasmaker is a battery of direct-reading gas-gauges, indicating the pressures in the blast-main, generator top and bottom, and superheater top; and these show at a glance the condition of the plant.

The air-blast is supplied by two 30 H.P. De Laval steam-turbines, each geared to a shaft connected by flexible couplings to a Sturtevant blower. Each is of ample capacity for two sections of the generating plant, although it is advisable to arrange so that both generators are not blowing at the same time. The steam is supplied at 100 lbs. pressure by a Babcock mechanical stoker boiler using fine breeze. The three plants are connected to a 24 in. gas-main, which joins at right angles with a 30 in. main which was formerly the foul-gas main of the coal-gas plant. The gas as it is generated may travel two ways—either along this pipe direct to the relief holder (of 350,000 c.ft. capacity), or in the opposite direction through the condensers, two scrubbers (which also serve the purpose of condensers, thence to a Bryan Donkin exhauster of 80,000 c.ft. per hour capacity, which drives it through an 8 in. main to the Dawsholm works, where it enters at the extreme ends of two foul mains and is mixed and purified along with the coal gas. By this arrangement, if the exhauster is drawing less gas than the plant is generating, the surplus gas goes to the holder, or if more gas, the excess is drawn from the holder.

As there is no meter for registering the gas, the exhauster has also to serve this purpose, and is fitted with a revolution counter. After tests drawing direct from the holder when the plant was off, we arrived at the quantity passed per revolution when working at a given back-pressure, and the revolutions multiplied by the capacity, *plus* or *minus* the difference of stock in the holders, gives us the make per day, after being corrected for temperature and pressure.

The coke for the plant is raised to the charging platform in bogies by means of a belt-driven hoist. The engine for this also supplies power, by a rope-drive, to the ash-handling plant, which removes the ashes from the generators and the boiler into the trucks. Since the plant was erected, only blue gas has been manufactured—the process being very simple.

METHOD OF WORKING.

With a small fire in the generator beforehand, gas-making can be proceeded with in less than an hour. When the fuel bed is deep enough, the air-blast is admitted to the generator base and the body of coke is raised to incandescence in (say) two minutes; the producer gas thus formed passing through the carburettor, superheater, and stack-valve to the atmosphere. The blast is then shut off, and the steam admitted to the bottom of the generator, where it passes upwards through the incandescent coke. The stack-valve is closed, and the gases pass through the apparatus to an off-take pipe at the top of the superheater. This pipe is sealed in the washer to a depth of 4 in., and another pipe from the top of the washer leads the gas to the main in connection with the holder or exhauster. This steaming is continued for (say) four minutes. By this time the temperature of the coke in the generator is greatly reduced by the absorption of heat through converting the steam into CO and H_2; and it is again necessary to blow-up the fire. The steam is shut off, and the blast and stack valves opened. This blow and run alternately go on continuously, with a stop (say) every 35 minutes for coke, and every four hours for clinkering purposes. As mentioned before, the steam may be admitted either at the bottom or top of the generator. Some prefer up-and-down running, and others split runs, which is a portion of the run up, and the other portion of the time on the down run.

By altering the method of running, the hottest zone in the generator can at will be either at the top, bottom, or middle. At present, complete down running seems to be most in favour, as with the hottest zone at the bottom the clinker formed by the ash in the coke is usually run down on to the fire-bars, where it is easily removed. The first trouble which we met with—and one which still lingers with us, although to a less degree—is that the clinker grows on the generator walls; and although we have tried various means either to prevent or remove it, we have not yet met with success. The first generator lit up was set on a six-minutes cycle—two minutes blow and four minutes run, one up, two down, and one up—the blast pressure in the main being 20½ in., which gave 18 in. at the generator base during the blow, and the steam 30 lbs. per minute. As, however, the clinker showed a great tendency to adhere to the walls, the run was changed to ½ × 2½ × 1, with the view of bringing the hot zone further down, and running the clinker on to the bars. This did not improve matters; and the down running was then increased to three minutes, and later to 3½ minutes, without any improvement.

The cycle was again changed to three blow and five run (0 × 4 × 1); but this only made the clinker trouble worse. The run was then reduced to four minutes (0 × 3½ × ½); but no change seemed to overcome the hanging clinker—in fact, the three minutes blow only seemed to aggravate the trouble. The brick lining of the generators was built so as to form a bosh just above the clinkering doors. This reduced the diameter of the generator at this point from 6 ft. to 4 ft. 6 in., and with the idea of allowing the clinker greater facility to run down on to the bars, the bosh was cut out and altered to straight lining, and the generator set to work on a six-minutes cycle, two-blow (0 × 3 × 1). But even this was of no avail, as the generator was completely clinkered-up in five days. Another generator with boshed lining was then started; and aiming at working with lower temperatures, the blast pressure was reduced to 15½ in. with all valves closed, which gave 13 in. pressure at the generator base during the blow. This, however, did not have the desired effect either.

We reverted back to our former methods, and another was set away, with the blow increasing as time went on from 1½ minutes to 3 minutes; the run being four minutes, with one up run to each two down runs. Strange to say, the generator worked for two months before it was completely clinkered-up; and although the make of gas was much reduced during the greater part of the period, we were quite pleased to think we were coming nearer the solution. But, alas, when we tried the same method again, with another generator, it was completely closed in nine days. After further experience, we arrived at the conclusion that the temperatures at which we were working were just on the high side, and tended to form the clinker solid, like slag. Following up this idea, the blast was brought down to 16½ in., and the blow was kept at two minutes and the run extended to five minutes (2 × 2½ × ½); and with this cycle the generator remained at work for 34 days.

Although the clinkers were heavy on the bars, a certain amount adhered to the walls; but every few days huge chunks like concrete would drop down, and had to be broken-up by means of heavy hammers and pinch-bars before they could be removed. This helped to keep the generator open, and was the best method tried so far, as it would take four weeks before the make of gas was reduced to 500,000 c.ft. But the drawback was that we only obtained 180 runs per day at about 4400 c.ft. of gas per run, which brought out the gas made per day to about 750,000 c.ft. This was about 100,000 c.ft. less than was previously given with the six minutes cycle, which gave about 210 runs at 4000 c.ft. per run.

A shorter cycle of five minutes, 1½ blow and 3½ run (1 × 2 × ½), with blast at 17½ in. and steam at 28 lbs. (according to the CO_2 content of the gas), was then tried. This cycle has proved the most satisfactory of the lot, and is the one that is still worked. The make of gas per day amounts to, at 255 runs at 3800 c.ft. per run, 969,000 c.ft. when the generator is fresh on; and on occasions we have exceeded a million.

Although the clinker still forms on the walls, it does not accumulate so rapidly; and we are able to keep a generator at work for about four weeks before the make drops to 700,000 c.ft. When this figure is reached, we consider it pays to put the generator off and cut-out the clinker by hand. It really requires to be put off at any rate, as the bottom of the superheater is completely filled with dust at this period. We have tried complete down-running without any more success; and owing to high heat on the bottom since the brick lining was built straight, the cast-iron stools which support the brickwork above the clinkering doors burn through in a very short while. For a time we allowed the fuel bed to get low before clinkering; so that when cleaned-out the clinker was seen forming a ring round the walls above the clinkering doors.

A heavy pinch-bar with a wide chisel point was fastened to a rope passing over a pulley-block attached to the roof girders above

the generator charging door. Three men guided the bar and three on the rope lifted it up. It was then propelled down on the top of the clinker with all the force of the three men, in addition to the weight of the bar. But it was wasted energy, as it only made a dent in the clinker, and any fragments broken off were so small as to be of no account. This weight would certainly have had some effect if the clinker were cold, but not when hot.

I noticed some time ago an extract from a paper read before the American Gas Association, where a similar device had been tried, using a bar weighing 5 cwt., and the walls could be cleared in 12 minutes. But I am doubtful if a bar even of this weight would have proved effective without damaging the lining. Even when cutting-out the cold clinker, I have seen half-an-inch of the face of some bricks come away along with the clinker. In a later paper to the same Association, a method was described whereby water was played on the hot clinker as a means of bursting it, when it could be pinched-down from the top. We also tried this about a year ago—more as a means of cooling the clinker rapidly than with the view of making it brittle; but as we got one of the charging door mouthpieces cracked, this was discontinued. However, after reading the article, and having a spare mouthpiece beside us in case of damage, we again tried it, with the clinker exceedingly hot this time. But it did not have the expected effect. We have frequently taken a lump of clinker dazzling hot out of a generator and immediately plied a hose on it till cool; and it is as difficult to break it then as if it had been left to cool in the air. So I have arrived at the conclusion that the American clinker is not the same as the home product, and am still working with the old method of cutting-out by hand. I have never yet heard of a generator having to be shut-down on account of clinker when using English coke; for although it may sometimes appear on the walls when the coke is changed, by altering the running it can usually be run-down in a few hours. This trouble is found more or less in all plants in Scotland, and is probably due to the nature and large percentage of ash in the coke, which seems to have a very high fusion point—being high in silica and alumina, and low in alkaline salts.

The percentage of ash in the coke at our works varies between 9 p.ct. and 43 p.ct.; a fair average being 22 p.ct. of ash and 12 p.ct. of moisture. The high ash content is due to the coal which is allocated to us by the Controller not being suitable for gas-making purposes. When the control is removed, we will then be in a position to select the coke for this plant; and our troubles should be greatly reduced, and the results improved.

Another little trouble which may seem trivial to you, but one which caused us a lot of annoyance and also loss of gas, was the safety canvas flanges giving way on the blast pipes, where they enter the generators. For some two months, we were continually renewing these—sometimes two in one day; and as it necessitated shutting-down both plants each time, it was decidedly awkward. On examination, the canvases appeared to have holes burned in them; but it was difficult to understand how they could be burnt, as the blast-valve was between the generator bottom and the canvas. I therefore decided to keep a close watch on the gas-makers. When working on a down-run, it is necessary to finish with about half-a-minute up-run, so that the bottom of the generator is purged by the steam of the residual down-run gas before opening the blast-valve; and I found that occasionally they forgot this until the run was finished. As the locking gear prevented the men from shutting-off the steam when on the down-run, they would reverse the valve, shut-off the steam right away, and open the blast-valve to the generator. Through the mixture of gas and air in the generator ash-pit becoming ignited by the hot ashes, a slight explosion took place, causing a few hot cinders to be blown through the open blast-valve against the canvas flange. Since warning the men about this, I have had no further renewals to make there.

Another matter which troubles us greatly is coke dust, although we hope to have this removed at an early date, by means of dust interceptors on each plant. The coke used is all riddled through a 1 in. mesh rotary riddle, and is filled out of the trucks by 1 in. mesh coke-forks. Yet when used in the generators, during the blow, coke dust simply rains all over the place, blocking-up the gutters on the surrounding buildings to such an extent that two men could be quite easily fully employed doing nothing else but clearing them. Large quantities also accumulate at the bottom of the carburettor and superheater; and the overflow sealpots must be cleared out regularly, or the accumulation of dust in the bottom is apt to block the overflow pipe from the washer, causing the water to rise therein and thus throw sufficient back-pressure on the plant to blow the gauges on the platform. We have also had trouble with the engines through the dust getting into the bearings, and especially with the turbines, as the suction of the fans draws it into the house and it gets into the oil-tanks and feeds to the bearings. All the oil is now strained through a fine mesh gauze before being used. During the past nine months we only ran a turbine for a fortnight to three weeks at a time, when it was put off, and the bearings and oil channels were thoroughly cleaned out; and we were never troubled with them heating-up above the usual temperature, which is fairly high. The oil that passes through the turbines is collected in a chamber in the soleplate, and is withdrawn and filtered, and then used for all the other slower moving engines.

You will notice by the capacity of the exhauster and the size of the main to Dawsholm that it was only the intention to work two sets at a time. It is unfortunate that the main is so small, as it would have been a great benefit during a time of fog, such as we have lately experienced, if we were able to put on the third set. Even with the three sets the percentage of water gas would only be about 25. At present it ranges between 15 p.ct. and 18 p.ct. With the two sets, the make of gas is maintained at from 1,500,000 to 1,800,000 c.ft. per day, keeping the CO_2 content between 3 p.ct. and 5 p.ct. and the nitrogen between 6 p.ct. and 8 p.ct. The average composition of the gas is: CO, 40·2 p.ct.; H_2, 46·2 p.ct.; CH_4, 2·1 p.ct.; CO_2, 4·5 p.ct.; N_2, 7 p.ct. The calorific value is about 300 B.Th.U. gross.

The percentage of inerts may seem fairly high; but when you take into consideration that the generators are gradually closing-up with clinker, it is a little difficult to keep them down—particularly the nitrogen. The percentage of CO_2 can be easily kept round about 3 p.ct., and the N_2 has frequently been at 4 p.ct. The best analysis which we have yet obtained is: H_2, 51·3 p.ct.; CH_4, 1·5 p.ct.; CO, 41·7 p.ct.; CO_2, 3 p.ct.; N_2, 2·5 p.ct. But to get the inerts down to this figure, 5·5 p.ct., means the loss of a fair quantity of gas. In a complete blue-gas plant, it should not be difficult at all; but in a carburetted water gas plant, it is necessary to purge the carburettor and superheater of the residual blast gases before closing the stack-valve.

Another point which has a bearing on the CO_2 content of the gas is the fluctations in the steam pressure to the plant. The boiler safety-valve is weighted to blow off at 115 lbs. pressure. And although we try to work as far as possible round about 100 lbs., still the pressure varies between 90 and 115 lbs.; and a difference of 5 lbs. in the pressure alters the rate of flow of steam to the plant 1 lb. per minute.

The average coke used for gas making alone is 50 lbs. per 1000 c.ft., which gives the make of gas 44,800 c.ft. per ton. The steam used is about 30 lbs. per 1000 c.ft. The gas made in the past ten months—during part of which time only one generator was at work—amounted to 355,130,000 c.ft. This must have effected a saving of close on 33,000 tons of coal, which in itself was a great advantage during a time when the supplies were extremely short. During the year the costs of gas making have greatly increased, owing to higher wages and increased price of fuel. The following are the costs at present, in pence per 1000 c.ft., of gas made.

	d.
Gas making	3·58
Cutting-out clinker	0·06
Coke, at 33s. 9d. per ton	9·15
Fine breeze to boiler at 10s. per ton	1·20
Repairs, materials, and stores	0·40
Total	14·39

The costs are higher than usual for water-gas manufacture. But it must be taken into consideration that the Temple works stand by themselves, and the costs for supervision are now more than if the plant was in the same works as the coal-gas plant; also the same boiler which supplies steam to the plant supplied steam to the remainder of the works. Last winter, it was with difficulty that the pressure of steam to the plant was maintained; but after slight repairs to the boiler, we are now able to keep up steam to the holders, &c., which was formerly supplied during the winter months by means of two Lancashire and one locomotive-type boilers. With the saving of this boiler fuel, *plus* the wages of three men, less the increased amount of fine breeze to the mechanical stoker boiler, it has effected a saving to the department of £64 per week during the winter months, which, if deducted from the cost of the water gas, would reduce the figure by (say) 1·4d. per 1000 c.ft.

DISCUSSION.

Mr. WALTER PATERSON (Tradeston) considered that where horizontal retorts were in use water-gas plant would be a valuable asset.

Mr. JAMES JAMIESON (Greenock), referring to the steam-meters used, asked if they were reliable instruments. He considered that coke with an ash content of 43 p.ct. was abnormal, as it would mean that the coal itself would have about 30 p.ct. of ash. He thought the price per 1000 c.ft. very high, as some places working with horizontal retorts were making coal gas at very near the figure mentioned by Mr. M'Nicol.

Mr. JOHN FRAZER (Dalmarnock) referred to the dust interceptors proposed to be added to the plant. He explained that the process adopted in several places for eliminating dust from coke was to screen the coke in a rotary screen immersed in water. Regarding the working costs for boilers generating steam, Mr. M'Nicol's figure showing a saving of £64 per week was considerably out.

Mr. DAVID FULTON (Helensburgh) referred to the absence of a meter for registering the water gas which naturally did not permit Mr. M'Nicol to arrive at his costs so accurately as they might have done. He found that for the first six months of the current year it cost his department 14·38d. per 1000 c.ft. to produce combined coal and water gas of 440 to 450 B.Th.U. in vertical retorts, which was about the same as Mr. M'Nicol's figure for the blue water gas of 300 B.Th.U. Regarding the clinker troubles, he had tried the method of playing water on the hot clinker to burst it up, and found it very effective; the clinker coming away much easier than before.

Mr. R. CROSS (Tradeston Chemical Works) asked if the clinker was of any commercial value, as he thought it might be used in tar macadam work.

Mr. THOMAS MOFFAT (Tradeston) considered it strange that surplus unpurified gas should go direct to the holder.

Mr. JAMES BELL (Dumbarton) said that, working-out the figures given by Mr. M'Nicol, he calculated that the water gas produced per ton of fuel would represent about 13½ million B.Th.U. In vertical retorts, with ordinary steaming, 7½ to 8 million B.Th.U. could be obtained, and, in addition, residual products from the coal equivalent to

1s. 2d. per 1000 c.ft., thereby considerably affecting the cost of production in verticals.

Mr. JOHN M'INTYRE (Glasgow) referred to the poor quality of coal being received by gas-works, and considered that combined and aggressive action should be taken by gas undertakings to get coal suitable for their needs.

The PRESIDENT mentioned that he had not had much experience in the production of water gas. He considered his working results for coal gas, of 440 to 460 B.Th.U. in horizontals, compared very favourably with those quoted by Mr. M'Nicol for water gas of 300 B.Th.U. He was surprised that an 8-in. pipe was used for conveying the water gas from the Temple to the Dawsholm works, while 24-in. pipes were necessary for the remainder of the plant.

Mr. M'NICOL, replying to the various speakers, said that in works where horizontal retorts were in use, water gas would no doubt be the means to be adopted to reduce the quality of the gas to the lower standard which would rule in the future. In reply to Mr. Jamieson, he said the steam-meters were none too reliable. Messrs. Humphreys and Glasgow supplied them. The makers, he believed, were Messrs. Dewrance. Although some seemed to doubt the accuracy of his statement regarding the high percentage of ash in the coke, he found that during the last twenty weeks it averaged about 22 p.ct., and only the other day it reached 38 p.ct. As regards costs, he believed verticals with steaming were really the cheapest method of production; but his costs for water gas were only about half those ruling throughout the country for horizontals. With the three sets of water-gas plant in operation, his costs would be much lower. As to dust interceptors, Messrs. Humphreys and Glasgow had a very good one—a water-spray being the means of intercepting the dust. His costs for gas making included the cost of all labour and materials, stores, oil, &c., including the boilerman's wages and removal of ashes from the boiler. The one boiler now met the requirements of the whole of the works, which during last winter were met by means of two Lancashire and one locomotive type boilers. Replying to Mr. Fulton's remarks regarding the absence of a meter for registering the gas, the figures given by him were only comparative. He stated that the water gas did not go to the district unpurified. The holder to which the surplus gas passed was only a relief holder from which the water gas went to Dawsholm for purification. He did not think the clinker was of any commercial value. He expected that at an early date gas undertakings would be again in their old position of being able to purchase their coals in the open market.

The author was cordially thanked for his paper.

LAMBERT AND THE ORIGIN OF PHOTOMETRY.

The President of the Illuminating Engineering Society (Mr. A. P. Trotter), at the meeting at the Royal Society of Arts last Tuesday, told the members of the part that Lambert (who was born in 1728 at Mulhausen, then a town in Switzerland) had in the origin of the science of photometry. He was a prolific writer, and in 1760 published "Photometria" in Latin. The title-page is in Latin; but half the preface is in French. In it, he refers to the work of Newton and of Euler, and to the optical researches of Smith and Kaestner. He alludes to the excellent "Essai d'Optique sur la Graduation de la Lumière" of Bouguer (published in 1729); but he does not mention Bouguer's memoir on "Means for Measuring Light and Some Applications of those Means," published in 1757, nor the "Traité d'Optique, published 1760, two years after Bouguer died. If he had seen these, he would not have lamented the non-esistence of a photometer.

In "Photometria," Lambert says it is much to be wished that a photometer should be "excogitated," analogous to a thermometer, which would indicate the intensity and brightness of a light exposed to it. He dwells on this, and remarks that, in estimating the graduations of light, the eye alone is the judge. He is also found saying that while we can reproduce any given sound with musical instruments, and though light of various kinds can be produced by flames, we cannot obtain a light of constant brightness, and reproduce it like the note of a trumpet. Then he adds, in italics: "The eye therefore lacks instruments like the thermometer or organ, so that, when left to itself, it might give judgment." On p. 16, he makes a statement which is the foundation of all photometry—namely, that in estimating degrees of brightness no ratio is of value except that of equality. After twenty-three pages of very interesting introduction, Lambert prepares for work by giving three "primary notions."

(1) Two or more candles give more light than one.
(2) An object moved nearer to a light becomes brighter.
(3) Light falling at an angle on a surface illuminates it less.

Lambert then states the law of the squares of the distance, and also the celebrated law connected with his name—Lambert's cosine law—and proves it with his first diagram. Like some other Continental writers of this period, he took the inclination of the ray with the surface as the angle of incidence, and therefore wrote "sine" instead of "cosine." "The normal illumination will be to the oblique illumination as the whole sine is to the sine of the angle of incidence." Modern writers who have not read Lambert's work are disposed to attribute to him, and to expand his law to cover, all cases in which the cosine function appears in the theory of illumination. A recent book upon searchlights suggests that Lambert's law explains the distribution of light from the electric arc.

The President illustrated one of Lambert's experiments with candles; and Mr. Trotter's observation was that it is very remarkable that, having made this experiment, or even having conceived it from his mathematical knowledge, he should not have recognized that it afforded a means for measuring light. The question remains: Did he or did he not invent a photometer? The President is inclined to think, in spite of the title of his great work, that he did not, and that Bouguer was the first man to measure light. In the index to "Photometria," there are two references to "Instrumenta Photometrica;" but these relate to experiments with colours, and not to anything like a photometric instrument.

It is probable that before his death in 1778 Lambert had heard of Bouguer's photometer, which is to-day the official instrument used by the Metropolitan Gas Referees.

Enormous Fields Open to the Gas Industry.

Some big figures were quoted by Mr. C. E. Bartlett, in a paper he read at the American Gas Association convention, on the outlook for the gas industry. There are, he said, to-day nearly 50 million people in gas-served territory in the States; and there are 8½ million consumers using 327,000 million c.ft. of gas per annum. All gas must be used through appliances; and the market for appliances might to some extent be calculated. Taking the purchasing power of 40 million people even at $1 per head (a figure attained in the past by many companies), it would mean an annual sale of $40,000,000 in appliances, which is well over twice the present output of all the appliance manufacturers combined. Of the 8½ million consumers of artificial gas already referred to, a reasonable estimate is that 6½ millions are domestic consumers. Allowing five persons to a family, this leaves 3½ million families not on gas-mains, though living in gas-served territories. From 1913 to 1914, the increase in the number of meters connected was 468,000. From 1913 to 1919, therefore, there should have been a total increase of 2,808,000, instead of which the actual figure was 1,688,000. There thus now exists a shortage of 1,121,000 new consumers over this period. There is a shortage of houses in the States to the extent of between 1 and 1½ millions. Taking the lower figure, and presuming that only 50 p.ct. of this shortage is in gas-served territory, and that 75 p.ct. of the 50 p.ct. is in artificial gas territory, it will be seen that 375,000 new homes are due to arise (as soon as they can be built) along artificial gas-mains. If the ratio of 65 p.ct. of gas consumers to the total population be maintained, 243,750 consumers will be ready and waiting for gas equipment. But promising as the field for new consumers now appears to be, the big prospective market lies in the present 6½ million domestic consumer families, who might be induced to use a far greater number of gas appliances.

Maximum Price at Paisley.—The Secretary for Scotland has made an Order authorizing the Town Council of Paisley to charge for gas supplied by them not exceeding 6s. 3d. per 1000 c.ft. as from April 1 last. Under the former provisions the maximum price could not exceed 4s. 2d., but increase in costs compelled the Corporation to advance the gas-rate beyond that figure, and authority was consequently required. The charge at present is 5s. 5d.

Temporary Increase of Charges Act.—Applications have been received by the Ministry of Health for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act from the Arlecdon and Frizington Urban District Council, Bala Urban District Council, Ellesmere Urban District Council, and Rhondda Urban District Council. Orders have been made by the Ministry increasing the maximum price chargeable by the Ellesmere Urban District Council from 6s. to 7s. 6d. per 1000 c.ft.; and by the Neyland Urban District Council from 5s. 6d. to 8s. 3d.

A Justifiable Price Increase in Melbourne.—A Board of Inquiry appointed by the State Ministry to investigate the justification for an increase of 1s. 6d. per 1000 c.ft. in the price of gas supplied by the Metropolitan Gas Company of Melbourne, on the ground of the higher cost of railborne coal during the seamen's strike, have reported that the increase was fair and equitable. The additional cost to the Company of the overland coal was said to amount to nearly 2s. per 1000 c.ft. of gas. The Coal Board, it is added, are of opinion that for the present stocks of coal should be supplemented by rail supplies; and the additional cost of gas will have to be borne by the public. It was understood that the Company intended to make a reduction for the month in respect of which meter-readings would be taken in the middle of October; the amount of the reduction to be governed by the quantity of coal brought overland during this period.

Next Friday afternoon a visit is to be paid by the London and Southern District Junior Gas Association to the works at Westminster of Messrs. William Sugg & Co. On Dec. 19 there will be a business meeting, at which Mr. J. G. Clark, of the Gas Light and Coke Company, will read a paper entitled "Topics for Discussion."

The first quarterly meeting for the session of the Scottish Junior Gas Association (Eastern District) will be held at Perth next Saturday. The members will inspect the workshops, the governor-house, and the boosting plant; and Mr. David Vass, the Gas Engineer and Manager, will address them on the subject of "Purification."

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Two-Inch Pressure Blunder.—The Ten Shilling Coal Price Reduction.

SIR,—A further "alarm" needs "sounding" in the gas industry as to the new provision unfortunately agreed to in settling the terms for the initiation of the new conditions of supply under the "Beilby" report.

Because a few railway depôts have been badly and very unwisely treated by short-sighted and mistaken gas undertakings through the country in not having been fully supplied at sufficient pressure with the gas they much wanted, and would have been profitably supplied, a sort of campaign has been waged against us as an industry by our friends the railway companies; and in Parliament and at the Board of Trade, they have sought (and here and there succeeded) to get our pressure obligations increased fourfold. Candidly, I think they have a right to resent being stupidly kept short of the gas they wanted to use, and pay for very profitably to us. I have come across the story in several parliamentary cases, and have felt that they were right. To neglect the wants of such large customers was not only criminal, but, as Talleyrand expressed it, it was "worse—a blunder."

But at the meeting of those settling the agreement for the Beilby report, I found the public authorities generally clamouring for this exaction to be fixed upon us everywhere at the "inlet of the consumer's meter." Vainly did I urge that these points were beyond the undertaker's control, and at variance with the whole established practice, and that I believed it was impossible of accomplishment with existing means, and would lead to enormous cost which must fall ultimately on the consumer. To my astonishment, it was assented to, with only the modification that it was to be at the meter end of a 2-in. service. Even practical gas engineers assented to it as a general proposition.

Had it been limited to services of railway companies, I should have felt it to be right, as round a railway station or depôt, there is always a village or some habitations of importance. But, as it stands, I stake my reputation, derived from the conduct of between thirty and forty different gas undertakings for many years, that it is utterly impossible of general fulfilment, and will, in the first place, drag us into police courts for penalties, or put our consumers to the cost for capital outlay of enormous amounts, entirely futile.

As the conditions of our distributing system were never laid-out for it, and after five years' disablement, facing the present cost of main pipes will need fabulous outlay. The whole thing is a blunder, and mars the virtue of an otherwise proper and reasonable readjustment to meet the views of Sir George Beilby.

It was settled by a vote in which town clerks and their clerks and solicitors, &c., all voted without really understanding what they were doing; and I was bitterly disappointed that the gas men in the room did not know better, though Mr. Price, of Hampton Wick, did back me up right well.

Now I have another alarm to sound, and that is this blundering coal reduction of 10s. to heaven knows whom? Are toffee shops, bakers, and butchers domestic or industrial?

Is the provision, besides catching the most votes, going to employ the largest numbers of "limpet" or "leech" hangers-on to inspect our consumers, our books, our works? It looks like an army of bureaucratic coal and fuel controllers going on like the brook "for ever." Have we not had enough of control altogether? Has it not harassed our lives and lowered our dividends enough?

Now just as some of us were issuing notices to raise the price of gas, we are flung into chaos; for what the 10s. means no one understands, and no man living can justify. But we must not reckon on it as a permanent change, as it is to depend on the getting of coals, and the endurance of our poor allies, who are to pay the difference.

I have another warning on the expected advantages of selling gas by the "therm" when of low-grade qualities; but that must keep. Without a coke-oven friendly and near I doubt the gain.

13, *Queen Anne's Gate, S.W., Nov.* 28, 1919. HY. E. JONES.

A Line of Action to be Deplored.

SIR,—I am an old gas industry man, and a holder of stock in both the Gas Light and Coke Company and the South Metropolitan Gas Company—not large, but sufficient for me to have an interest in them and their work, supplementary to that which arises from almost a life-long devotion to the service of the industry.

As an old gas industry man, it is painful for me to see, what so many others have spoken to me of, the rift that so obviously exists between the two great London Companies, which cannot but be hurtful to the industry as a whole. Whence comes this rift, and what is the reason for its continued existence? In Whitehall, a voice asks, "What of the good boys in the Old Kent Road?" I am ashamed. The voice is not that of a gas man, but of one whose professional work causes him to have relations with the industry. I am ashamed because the incident shows me that others besides gas men have their eyes on the internal affairs of the gas industry, and have noticed an unpleasant feature.

It seems to me (I hope I am mistaken) that there is little that those in the chief offices of the Gas Light and Coke Company can do, that is right in the eyes of those in the chief offices of the South Metropolitan Gas Company. I look back. Great voluntary and self-sacrificing work has been done for the industry, in its organized state, by those at the head of the former Company. Very little indeed—I was almost writing "nothing"—they do or are concerned in appears to meet with cordial approbation (certainly endorsement cannot be detected) on the South Side of the Thames, though confirmed by such a large proportion of the administrative and technical men of the industry. I cannot think that the South Metropolitan Company possess a monopoly of brains and of right-doing, and that the rest of the gas men of our industry are numskulls, and do not know what they are about. In the co-operative efforts that I have in mind, while the Governor of the Gas Light and Coke Company may be President, my knowledge of the composition of Councils and Committees is that they are representative of all parts of the industry. But when and where do we see the South Metropolitan Gas Company taking a real active interest and part? Is it superiority that lifts them above co-operative effort to advance and defend the interests of the industry?

I again look back through the records. I see a letter—not addressed to the "JOURNAL," but to a daily paper—dealing with benzol, that appeared just when not a few gas undertakings in the gas industry had oil-washing plants released from war work, and were considering the development of the motor fuel business. More than once, as you have pointed out, Sir, there have been boastings of the high quality of gas in South London, and criticisms of poor-quality gas elsewhere, during war time and pressure for coal; and then there came the public suggestion that those who obeyed, or did their best to obey, the wishes of the Coal Controller in the days of a great national emergency should have simultaneously reduced their price. Concerning these matters, you put certain pointed questions individually to Dr. Carpenter and Mr. M'Leod. These questions have not been answered. Men who cannot be accused of being anything but sound-minded are asking: Are these things intended to sting, or are they the outcome of an overwhelming belief in one's own superiority and chastity, or of a desire to direct and rule without the mandate of the industry? The intention, of course, may have been that their application should be general. But it cannot be overlooked that standing at the head of the solid mass of gas undertakings that have not South Metropolitan in their titles is the Gas Light and Coke Company. Whether intentionally or otherwise, these doings, therefore, strike that Company first; and the fact is as well known in South London, as it is recognized in the rest of the country. Looking back through the records again, I have failed to find any single public or unkind reference to, or criticism of, the South Metropolitan Gas Company or any other gas undertaking that has emanated from any present occupant of an administrative or official position in the Gas Light and Coke Company. To me, an old gas man, the fact speaks in plain terms, as I know it does to others.

In my career, I have learned that the best way to convert people to my way of thinking is to be among them, to get where they are, to take part in their deliberations and discussions, and so try to correct what I believe to be wrong. It is a better plan than throwing stones out of an office door. The stones may hit and hurt, but they will not convince. Science breathes refinement; and her methods are refined. Science expects the same in and from her votaries. Science does not need a stinging pen or voice to carry conviction, or to show people the errors of their ways. It can lead by its own good work; and it calls for no method that is foreign to its own spirit to establish its claims as against that which is unscientific.

To return to the recent correspondence in your columns, Sir, Mr. M'Leod has not answered the questions put to him; but Dr. Carpenter, in your last issue, has spoken, but has not replied, for him. The questions are pushed aside; and there appears instead: "We tell the interviewer the whole truth to the best of our knowledge." To tell "the whole truth to the best of our knowledge," there must be no omissions that are relevant to "the whole truth." Dr. Carpenter will agree with me in this, if not with other points in this letter. Therefore, it should be an easy matter for Mr. M'Leod to himself reply to the questions that you addressed to him, and which I expected to find answered when I opened the "JOURNAL" this week. I was sorry to see they were not, and to find they had been shunted on to the South Metropolitan sidings to take their stand with other inconvenient inquiries—*e.g.*, what tonnage of coal did the Company save as a result of the instruction of the Coal Controller during the period of the railway stoppage and the subsequent disorganization of our means of distribution?

I will not apologize for the length of this letter. The gas industry is now in a state of transition; and the pity of it is that there are at this critical time acts which, to my way of thinking, are not happily inspired, or performed. These acts attract the attention of those not in the industry. I think it is safe to say they are intended to do so. Among men of influence and understanding, however, they have no weight. Among the general public, always ready and willing since I was a boy to find fault with gas undertakings, they gratify and incite. Need these things be? If Dr. Carpenter, satisfied with the South Metropolitan Company's policy, desires to convince the gas industry of the errors of its ways, and reform it, then my advice to him is to come out, and take constant and prominent part in the deliberations of the recognized organizations of the industry. There is better work to be done there than there is through other selected channels.

I have personal friends in both the South Metropolitan and the Gas Light and Coke Companies; and so I prefer to let my good intentions stand over the *nom de plume*,

Nov. 27, 1919. BROAD OUTLOOK.

Danger of Interference with Consumers' Conditions.

SIR,—You should, as the guardian of the interests of the gas industry the "JOURNAL" has consistently maintained so long, feel more than ordinary interest in those instances where gas is definitely being put aside. These cases are more frequent in the Metropolis than in the country. Nevertheless, they need watching, because frequently, by exerting a little attention, a dissatisfied customer can be saved; by neglect, he is lost.

I came across such a case last week. The owner of a shop with an outside light and six internal lights was having the premises wired for electricity. As I am an old customer, I inquired the reason. The proprietress did not allege this to be due to price so much as to the constant and repeated alterations in the terms. The outside light is on hire, for which maintenance is charged. This was "doubled" the other day; and this apparently proved to be the last straw, for the proprietress explained that, what with the annoyances with the mantles, and the increasing cost, "I determined to finish with it all." A little diplomacy, and less of the "doubling" policy, might easily have saved the supply.

If the organization that professes to represent selling departments

made it their business to visit customers and inquire if there were any complaints or room for improvement, it would be infinitely more useful than dinners and speeches at the Waldorf by learned professors who appear to be imbued with the notion that the only people who do not understand the industry are those who created it. New men and new methods are not always a success, as many a gas shareholder may find to his cost.

My point, however, is that frequent change and interference with the customer in the conditions of its supply, its cost, its quality, its use, are dangerous, and that they jeopardize the continuance of that supply. The industry depends on the customers, and not upon the scientific environment, however impressive, of the Board of Trade. The introduction of "Beilby" gas may prove a very dangerous experiment. The consumer who did not take very kindly to meters until the advent of the slot-meter convinced him that he was getting something for his money, will not appreciate reviewed interference in the language of the "percentage" of inerts, calorific standards, therms, and obscure methods of charging. Simplicity, non-interference, and quality are the things that matter.

5, *Victoria Street, S.W., Nov.* 25, 1919. ARTHUR SILVERTHORNE.

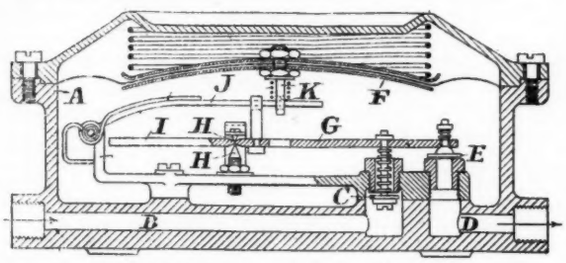
REGISTER OF PATENTS.

Automatically Opening and Closing a Gas-Conduit at Intervals of Time.—No. 117,456.

SVENSKA AKTIEBOLAGET GASACCUMULATOR, of Stockholm.

No. 11,255; July 9, 1918. Convention date, June 8, 1917.

This apparatus for automatically opening and closing a gas-conduit comprises a casing closed by a spring-actuated diaphragm which controls a valve in an inlet conduit to the diaphragm casing as well as a valve inserted in an outlet conduit. Both valves are so arranged and mounted upon one end of a rocking plate that they open in a direction against the pressure of the gas flowing through the valve-controlled conduit when the valve is in its open position.



A Swedish Gas-Valve Automatically Controlled.

The casing shown in section is connected with the inlet conduit B (controlled by a valve C), and with a gas outlet D, controlled by a valve E. The casing A is closed by a diaphragm F, loaded by a spring. The valves (arranged so as to open in opposite directions) are secured to a plate G mounted to rock on knife edges H and balanced by a projecting portion I extending on the opposite side of it. The plate is connected to the diaphragm by a bar through the upper part of which extends an arm J, mounted to rock on a stud and influenced by a spring. The arm extends with a certain play through a slot K in a bar fixed to the diaphragm.

The apparatus works as follows: With the parts in the position shown, gas flows through the inlet valve into the casing and causes the diaphragm F to move upwardly, so as to move the plate G upwardly and thereby to close the valve C and open the valve E as soon as the lower edge of the slot K abuts upon the arm J. The valve, however, is kept closed by the gas pressure prevailing until the pressure on the upper side of the valve E is overcome by the pressure on the diaphragm. When this occurs and the valve begins to open, it will be subject to pressure on its under side, whereby it will be fully opened. Simultaneously the valve C begins to close, so that the gas flowing through it will be throttled, and such a difference of the pressures on the upper and the under side of the valve will be established that the gas pressure in the inlet will tend to close the valve. The plate G thus will change its position, so that the valve E will be opened and the valve C closed.

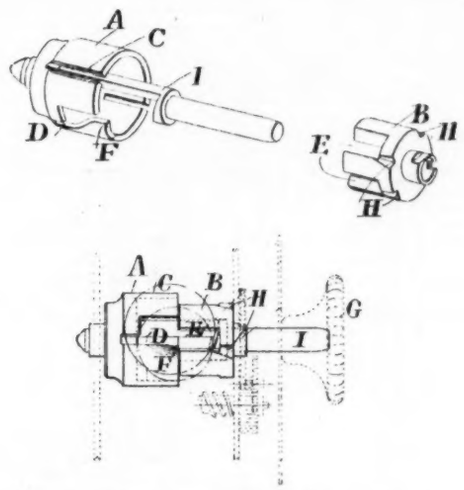
During the exhaust period of the gas from the casing the diaphragm moves downwardly until the upper edge of the slot K abuts upon the bar J. The diaphragm spring then tends to move the plate G downwardly and close the valve E, thereby opening the other valve, which, however, is kept closed until the pressure of the inlet gas is overcome by the pressure of the spring. As soon as this occurs, the valve C begins to open, whereby an augmented pressure is created on the upper side, and simultaneously (owing to the throttling of the valve E) a difference of pressure is established between the pressures of gas on its two sides. The inlet valve will then be opened completely, and the outlet valve simultaneously closed.

Coin-Carrier for Coin-Freed Gas-Meter Mechanism. No. 134,101.

GLOVER, T., of Angel Road, Edmonton.

No. 20,717; Dec. 12, 1918.

This coin-carrier is constructed from two slotted cups arranged with the open ends next each other—one being fixed to the shaft carrying the operating handle and the other loosely arranged on the shaft and connected with the operating mechanism; the shaft being cranked or cut away within the cups to allow of the coin resting within the cups with one portion of the edge preferably exposed. The cups are so constructed that either a penny or a halfpenny or two different sized coins (say 1s. or 6d) can be used to operate only according to the value of the coin.



Glover's Coin-Carrier for Gas-Meters.

A perspective elevation of the two cups and shaft is given—the cups being detached. There is also a plan of the cups (combined) and the shaft, showing the handle and one form of gear in dotted lines and also the relative positions of the two coins.

The cups A B are made of two different diameters; and in the larger one are two coin slots C D at an angle of 90° to each other. In the smaller one are four coin slots E, each at an angle of 90°. In the larger one the outer corner F of a wall of one slot is bent to approximately the outer diameter of the smaller cup, or there may be provided a pin or other device at the corner.

In the ordinary way the cups are operated one-half a revolution for each coin inserted; but with this construction for (say) the penny the cups are revolved half a revolution, while for the halfpenny the larger cup is revolved half a revolution, while the smaller cup is only revolved a quarter revolution. That is to say, the mechanism for a halfpenny is only moved half that effected for the penny.

On dropping in the penny after the two cups have been properly positioned for receiving the coin, on the movement of the handle G the coin is gripped between the walls of the slots C E in the two cups A B, and all are conveyed round the half revolution, when the motion is stopped as usual and the coin discharged—the cup B being held by a spring-controlled pawl engaging a notch H. The handle shaft I and the larger cup A are then returned for the slots C E in the cups A B to coincide for receiving a fresh coin. The action will be the same if a penny is dropped in. But if a halfpenny is used, it finds a position fully within the larger cup A; and this, being free from action on the halfpenny at that position, will (on being revolved) travel round a quarter revolution without acting on the coin, and then the bent corner F will engage the halfpenny, which will be gripped by the two cups A B, which will revolve the other quarter of the revolution before the coin is discharged. Thus the larger cup will revolve its full distance while the smaller cup will only be revolved a quarter of a revolution, and the mechanism only moved accordingly.

Destructive Distillation of Carbonaceous Materials. No. 134,236.

PERKIN, F. M., of New Oxford Street, W.C., and NITROGEN PRODUCTS AND CARBIDE COMPANY, LTD., of Winchester House, E.C.

No. 2920; Feb. 19, 1918.

This invention relates to the destructive distillation of carbonaceous material (under moderate or low temperatures) of the kind in which inert gas or steam in a highly superheated state is passed through the material during the carbonizing process, "to increase the yield of tar, tar-oils, and hydrocarbons of the so-called paraffin or aliphatic series."

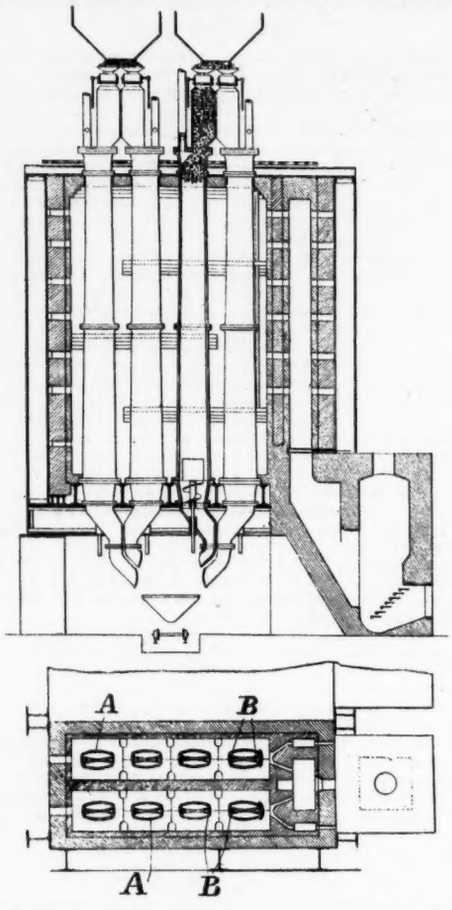
In connection with retorts for the manufacture of coal gas, the patentees point out that it has been proposed to provide in the walls of the retort tubes opening into the retort by small orifices, through which steam can be passed into the retort to produce water gas from the residue of the coke left in the retort.

The object of their present invention is to devise an improved form of apparatus for carrying out the distillation process first above referred to, comprising a plurality of inclined or vertical retorts of refractory material with passages or channels formed in their wall to assist in the superheating of the steam or gas to be passed through the retorts. These are of elliptical form in cross section, arranged together in pairs in such a manner that they have one or more walls in common, thus forming the necessary channels or passages for the superheating of the gas or steam.

The sectional elevation, and sectional plan reproduced (p. 498) show large vertical or inclined retorts of fire-clay, silica, or like refractory material and of an elongated elliptical cross-section; two or more retorts being built together so that they have one or more walls in

common" whereby a greater individual cubic capacity will be secured for each setting without proportionately increasing the external dimensions."

The patentees provide for the superheating of the gas or steam by causing it to pass through channels or passages B formed in the walls of the retort; this arrangement being advantageous in that no fittings are exposed to the action of the furnace; while the channels or passages



Perkin's (Nitrogen Products Company) Low-Temperature Carbonization Plant.

can be provided with radial slots or openings [not shown] communicating with the interior of the retorts, so as to obtain "an efficient and uniform distribution of the heating gases, which may be admitted either at the sides and bottom or in any other convenient position."

Framing for Supporting the Crowns of Gasholders.

No. 134,512.

DEMPSTER, R. & J., LTD., BEARD, G. F. H., and SCOTT, J. W., of Manchester.

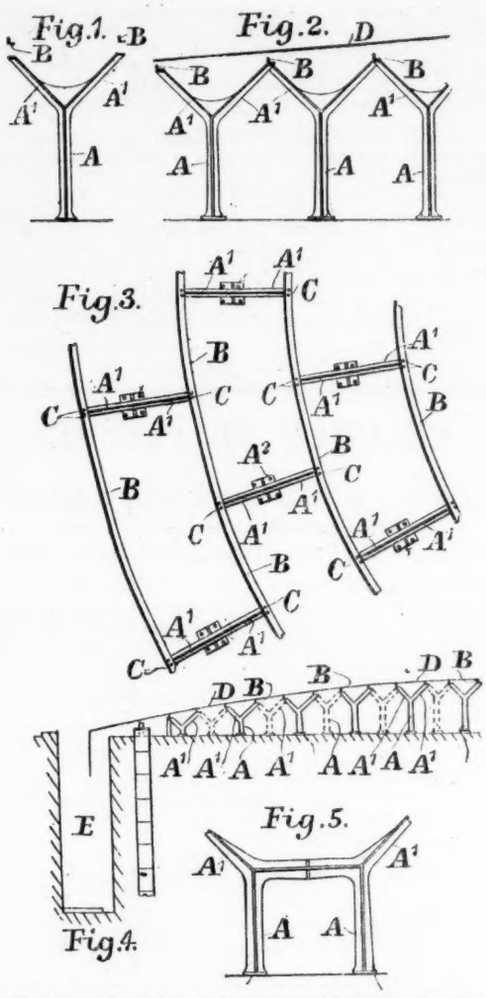
No. 22,639; Sept. 15, 1919.

The object of this invention is to provide columns or standards for supporting the gasholder framing in such manner that much of it may be dispensed with, "without impairing the stability of the structure as a whole," by providing the columns with branches or extensions capable of having parts of the framing attached to or connected with them, but so arranged that the connection between the framing on two branches is formed by the standard or column itself.

Fig. 1 shows in elevation one form of column, with parts of the framing in section and detached. Fig. 2 shows a number of standards in position for supporting some part of the gasholder crown, and having relation to the particular class of crown framing described in patent No. 109,039. Fig. 3 is a plan view of a portion of this kind of framing, in which the bars forming it are mainly circumferential in form, or approximately so. Fig. 4 is a sectional elevation of a portion of a concrete tank provided with columns according to figs. 1 and 2—a part of the crown of the gasholder being indicated in position, or resting upon the framing supported by the columns. Fig. 5 is a modified form of column or standard.

A is the upright part of the standard, which, instead of extending vertically to a part of the framing above, is shown provided with branches or extensions A^1. The upper extremities of these branches are capable of supporting members of the framing shown at B—that is to say, the members may be bolted to the extensions as at C (fig. 3). Thus the radial parts of the framing which would ordinarily be required to brace the members B together are not required, since the standards or columns perform the double function of holding-up the framing and bracing the members B together. By arranging the standards in staggered formation, as in fig. 3, the span of the members B between any pair of supports is reduced.

In figs. 2 and 4, D is a portion of the crown sheeting which in fig. 2



Beard and Scott's (R. & J. Dempster) Gasholder Framing.

is just about to rest upon the members B on the standard arms A^1; and in fig. 4 the crown sheeting is actually so resting.

Only a portion of the side sheeting of the inner lift or holder is shown in fig. 4—the sheeting entering an annular tank E. The standards being assumed in staggered formation in the examples named, those which are in the nearer plane are indicated by full lines, and those in a plane farther back by broken lines.

The standards or columns may be arranged in multiple or group form. For example, in fig. 5 a standard device in dual form is shown, provided with two uprights A and branches A^1. This form would be useful for large spans between members connected together by the arms.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Nov. 26.]

Nos. 28,402—29,152.

BAILEY, W. M.—"Automatically controlling flow of fluids." No. 28,748.

BROWN, J.—"Gas stoves or rings." No. 28,781.

CURD, S. G.—"Gas-fired glass-melting furnaces." No. 28,886.

ELLERAY, R. H.—"Incandescent gas-burners." No. 28,540.

FREDMAN, M.—"Incandescent gas-lighting burners, and galleries therefor." No. 28,774.

HOSOI, T.—"Gas-iron." No. 28,876.

JACKSON, E.—"Gas-burners." No. 28,734.

JORDAN, G. D.—"Means for converting liquid hydrocarbons into gas." No. 29,151.

LINDSAY LIGHT COMPANY.—"Manufacture of thorium." No. 28 749.

MARTIN ENGINEERING COMPANY.—See Jackson. No. 28,734.

MILNE & SON, J.—"Governors for gas-mains, &c." No. 28,667.

MILTON, H. M. N.—"Gas-engines." No. 28,490.

MILWAUKEE GAS SPECIALITY COMPANY.—"Igniting-devices." No. 29 095.

MILWAUKEE GAS SPECIALITY COMPANY.—"Valves." No. 29,096.

PRESTON, J. R.—See Bailey. No. 28,748.

STANIFORTH, H.—See Milne. No. 28,667.

STEELE, J. H.—"Liquid and gaseous burners." No. 29,085.

TAYLOR, T.—"Vapour burners." No. 28,545.

THOMPSTONE, F. W.—"Gas-burners." No. 28,874.

WADE, H.—See Lindsay. No. 28,749.

WELLINGTON, S. N.—"Destructive distillation of coal." No. 28 863.

WELLS, J.—"Producer gas." No. 28,859.

WILSON, J.—"Manufacture of mantles for incandescent gas lighting." No. 28,769.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Swinton and Mexborough Gas Board Bill was reported with amendments.

HOUSE OF COMMONS.

Electricity Supply Bill.—Modification of the "Any Other Form of Energy" Clause.

In the course of the debate on the Electricity Supply Bill last Tuesday, Captain BOWYER moved, and the amendment was agreed to, the insertion at the end of paragraph 2 of clause 15 (Subsidiary Powers of District Electricity Boards) of the following words: "Provided always that such district electricity board, local authority, company, or person shall in no case have the power to enter into arrangements for the supply by the board of any form of energy, other than electricity, in any area or district within which any undertakers may be authorized by Parliament to supply such form of energy unless and until such undertakers consent thereto and then only upon such terms and conditions as may be agreed upon with such undertakers."

Use of Electricity for Flashlight Advertisements.

Sir H. COWAN asked the President of the Board of Trade whether his attention had been called to the use of flashlight advertisements in London; and whether, having regard to the present shortage of fuel and the severely restricted rationing of coal, gas, and electricity for domestic, industrial, and other necessary purposes, he would consider the desirability of prohibiting the use of electricity for such advertising purposes pending the discontinuance of the rationing of these commodities.

Sir A. GEDDES said he was aware of the practice referred to. The restrictions on the use of gas and electricity for domestic purposes had recently been suspended in accordance with the general policy of the Department. He did not, therefore, consider it desirable to prohibit the use of electricity for advertising purposes.

Gas and Electricity Undertakings and the Coal Price Reduction. Household Coal (Ten-Shilling Reduction).

Sir J. BUTCHER asked the President of the Board of Trade if there would be a reduction in the price of domestic coke corresponding with the price of coal.

Sir A. GEDDES said they would work out the figures and give the necessary instructions as to the corresponding reduction in the price of coal purchased by gas and electric undertakings, so that allowances might be made in respect of the amount of coal used in producing gas and electric energy for light and power supplied for domestic and household use.

Captain BOWYER asked the President of the Board of Trade whether, and, if so, how, the recent reduction of 10s. per ton in household coal applied to electric and gas companies; and whether any arrangements had been made that a corresponding reduction should take place in the price of electricity and gas to consumers.

Mr. BRIDGEMAN (Parliamentary Secretary) replied that gas and electricity undertakings would receive at the reduced price that proportion of their total requirements of coal which the amount of gas or electricity supplied by them for domestic or household purposes bore to the total amount supplied by them. There would be an adjustment in the price of electricity and gas supplied for domestic or household purposes. As to this, the Coal Mines Department were in touch with the interests concerned.

Captain BOWYER asked if arrangements had already been made to this effect with the gas and electrical companies.

Mr. KILEY asked how electrical companies were to differentiate between electricity for private consumption and that for power.

Mr. BRIDGEMAN said he could not answer either of the questions offhand.

Major PRESCOTT asked whether gas companies who took advantage of the increase in the price of coal to raise the price of gas, regardless of their then existing stocks, would be required to effect forthwith an appropriate reduction in the price of gas in view of the 10s. per ton reduction in the price of coal; and whether the gas companies would be required to read their consumers' meters on or about Dec. 1, instead of the usual quarter-day.

Mr. BRIDGEMAN said that gas and electric energy would be reduced in price for domestic and household purposes. The detailed questions raised were now receiving the careful consideration of the Coal Controller. An announcement would be made at the earliest possible date.

Gas Quality and the Emergency Order.

Mr. WIGNALL asked the President of the Board of Trade whether he was aware of the dissatisfaction throughout the country as the result of the quality of gas supplied; whether the Emergency Order issued to gas companies during the recent railway strike had been rescinded; and whether he would take steps to ensure that householders would be supplied with sufficient gas for lighting and cooking purposes.

Mr. BRIDGEMAN, who replied, said that the Emergency Order was revoked on Oct. 28 last, and the restrictions on the supply of gas and electricity for household and domestic purposes were suspended on Nov. 19.

By order of the Directors of the Lea Bridge District Gas Company, Messrs. A. & W. Richards, of No. 37, Walbrook, E.C., are to sell by auction, at the Cannon Street Hotel, on Tuesday, the 16th inst., £20,000 of 6 p.ct. redeemable debenture stock.

NOTICES GIVEN FOR BILLS (SESSION 1920) RELATING TO GAS SUPPLY.

[Continued from p. 445.]

Blackpool Corporation.—The Blackpool Improvement Bill will relate to some extent to the gas undertaking. It is sought to extend the boundary of the borough so as to include Thornton and a certain area to the west of the borough; to extend the Corporation limits for the supply of gas so as to include the added area; to make applicable the provisions of section 120 of the Local Government Act, 1888, to officers of the authorities in the added area who may suffer loss; to provide that the Thornton Urban District Council's gas undertaking shall form part of the Corporation's existing undertaking; and to alter the charges for the supply of gas in Thornton, and empower the Corporation to charge therein differential prices for gas.

Coventry Corporation.—There will be some gas clauses in a General Bill which the Corporation intend to promote. The objects of these will be to extend the limits for the supply of gas so as to include the parishes of Wyken, Binley, and Walsgrave-on-Sowe; to authorize the use of certain land adjoining the existing works for the purposes of the undertaking; to authorize the purchase of additional lands, the substitution of a calorific for an illuminating power standard, the varying of the price of gas in the several parts of the area, and according to the purposes for which the gas is used, the regulation of the size and materials of gas-pipes and fittings upon premises supplied, with power to refuse a supply where the requirements are not complied with; to exempt the Corporation from obligation to supply when the capacity of the mains is insufficient; to empower the Corporation to produce or buy gas of any description, and supply it for heating, manufacturing, power, or other purposes; to exclude from application to such gas the provisions of the Gas-Works Clauses Acts and the Corporation Acts, and particularly the provisions relating to illuminating or calorific power, pressure, price, and obligation to supply, but to extend to such mains, pipes, and apparatus the provisions relating to the breaking-up of streets; and to prescribe such limitations and conditions in relation to such gas as may be deemed expedient. The Bill will also provide for establishing a superannuation fund, to be formed by contributions from the Corporation and the staff of officers and servants; for the retirement of all officers and servants, whether contributing to the proposed fund or not, on attaining an age prescribed by the Bill; for the borrowing of money; and for postponing payment to the sinking fund. The Corporation will ask for power to apply the revenue from their gas-works to any of the purposes of the undertaking, including the formation of a fund for working capital.

Halifax Corporation.—It is the intention of the Corporation to apply for a Various Purposes Act, which is, among other things, to alter or repeal the provisions of the Halifax Gas Act, 1855, prescribing the maximum price to be charged by the Corporation for the supply of gas, and to vary and increase this price; to enable them to purchase and work-up residual products; to confer powers with reference to the inspection and specification by the Corporation of gas-fittings on consumers' premises, the construction, placing, and inspection of pipes and other apparatus between the Corporation mains and the consumers' premises; to permit the Corporation to purchase or supply gas in bulk, whether within or beyond their gas limits; and to regulate the supply of gas. The Bill is also to extend the boundary of the borough so as to include the urban districts of Queensbury, Shelf, Hipperholme, Southowram, Elland, and Greetland, the borough of Brighouse, and the parish of Norwood Green and Coley; to extend the Corporation's limits for the supply of gas so as to include the added area; to exclude the added area from the limits of supply of any other body; to make applicable the provisions of section 120 of the Local Government Act, 1888, to officers of any authorities in the added area who may suffer loss.

Maidenhead Gas Company.—Notice is given by the Maidenhead Gas Company of their intention to promote a Bill to acquire a piece of land in the parish of Taplow.

Newtownards Urban District Council.—Our Irish Correspondent writes that the Newtownards Urban Council have decided to promote a Bill for various local improvements, including the reconstruction of the gas-works.

Pontypridd Urban District Council.—An Omnibus Bill of the Council will contain provisions for an increase in the price of gas, and the substitution of a new maximum price for the existing one; to empower the Council to purchase coke-oven gas, and gas in a crude and unpurified form, in bulk or otherwise, and to supply any such gas for lighting, heating, manufacturing, power, or other purposes, and to exclude from any such gas the provisions of the Gas-Works Clauses Acts and the Acts relating to the Council's gas undertaking—particularly the provisions relating to illuminating power, calorific power, pressure, and obligation to supply; to prescribe such limitations and conditions in relation to such gas as may be deemed expedient; to supply or purchase gas in bulk, whether within or beyond their limits; to regulate the supply of gas; and to borrow money for the purposes of the gas undertaking.

Risca Urban District Council.—Among the objects of a Bill to be promoted by the Council are, if deemed expedient, to relieve the Council from obligations to supply persons having a separate supply; to regulate generally the supply of gas; to authorize the Council to vary the prices charged by them for gas according to the purposes for which the gas is used; to confer, vary, or extinguish exemptions from the payment of any rates, rents, or charges; and to increase the price to be charged by the Council for gas supplied by them.

Rugby Gas Company.—In a Bill which the Company intend to promote, they will seek power to acquire for the purpose of erecting new gas-works certain land in the parish of Bilton; to extend the limits of supply so as to include the parishes of Dunchurch, Church Lawford, and Long Lawford; to raise capital, with or without a preferential or guaranteed dividend, and redeemable or irredeemable; and to make provision as to the appointment, qualification, &c., of a managing-director or directors; to form special purposes funds

and other funds. It is to empower the Company to inspect and examine meters, pipes, engines, or fittings, and to prohibit the use, and require the removal or alteration of, meters, pipes, and fittings of insufficient size or strength, or likely to allow of an escape of gas; to prescribe, the material, size, and strength of any meters, pipes, and fittings; and to relieve the Company from any obligation to supply gas to premises in which the meters, pipes, or fittings are defective or insufficient. Other clauses are to regulate the supply of gas; to make provision for prescribing the position in which consumers' meters, and pipes and fittings connected therewith, are to be placed; to enable the Company to manufacture and deal in meters, pipes, fittings, and other apparatus; to acquire patent rights or licences; to supply gas in bulk within or beyond the limits; to deal with the issue of stock under the co-partnership scheme; and to make superannuation and other allowances.

Southend Gas Company.—The Company are desirous of increasing their limits of supply so as to include the parish of Rochford, and parts of the parishes of Eastwood, Hawkwell, and Little Stambridge. The Bill they are promoting for this purpose will also enable them to acquire the undertaking now carried on by Messrs. H. S. & F. H. While as the Rochford Gas Company; to remove or alter any limits on the rates of dividend or interest on any preference or loan capital to be hereafter raised under the Company's Acts of 1904 and 1914, or to increase such rates and to apply to the Company, with or without modification, any provisions of the Statutory Companies (Redeemable Stock) Act, 1915; to increase the amount the Company may raise by debenture stock or borrowing; to increase the standard price of gas, and (if thought fit) to vary the standard rate and sliding scale of dividends; and to increase the charges for gas supplied by prepayment meter. The Bill is also to confer upon the Company further powers with reference to the construction and placing of pipes, &c., between mains and meters; to provide for a reduction in the standard calorific power, and make provisions as to pressure and testing; to apply to the Company, with or without modification, provisions of any General Act which may be passed before or in the ensuing session of Parliament relating to the basis of gas supply or charge; to establish a co-partnership scheme; to extend the period of five years limited by the Act of 1914 for laying mains within the parishes added to the area of supply under that Act; and to make superannuation or other allowances.

Sunderland Corporation.—A Bill is to be promoted by the Corporation to authorize them to acquire the undertaking of the Sunderland Gas Company and to supply gas; to employ or compensate the officers and servants; to compensate the Directors; and to carry into effect any agreement entered into between the Company and the Corporation before the passing of the Bill; in default of agreement, to settle by arbitration the amount of the purchase money; to supply gas in bulk or otherwise outside their limits; and to borrow money.

Sutton Coldfield Corporation.—There are to be included in an Omnibus Bill clauses to enable the Corporation to make regulations with regard to the sale of coke.

Tredegar Urban District Council.—Notice is given of the promotion by the Council of a General Purposes Bill, which will contain clauses to increase the maximum price chargeable for gas; to authorize the Council to purchase coke-oven gas or gas in a crude or unpurified form, and to supply it for lighting, heating, manufacturing, power, or other purposes; to provide for the application of the revenue arising from the gas undertaking, and for making good any deficiency; and to permit the formation of a reserve fund.

PROVISIONAL ORDER APPLICATIONS.

Great Marlow Gas Company, Ltd.—The Company give notice of their intention to apply to the Board of Trade for a Provisional Order authorizing them to raise additional capital; to increase the rate of dividend on preference capital and of interest payable; to empower the Company to form special purposes and other funds; to substitute for the existing maximum price of gas a sliding-scale; and to apply a calorific power standard to the gas, in place of the illuminating power one.

Great Yarmouth Gas Company.—Notice is given by the Company of an application to the Board of Trade for a Provisional Order to enable them to raise additional capital and redeemable or irredeemable debenture stock.

Ilford Gas Company.—Notice is given by the Company of their intention to apply to the Board of Trade for a Provisional Order to authorize them to create as preference stock any 1899 Act ordinary stock remaining unissued; to raise new capital; to empower the Directors to prescribe the rate of interest or dividend to be paid in respect of shares or stock to which any preference or priority is assigned; to provide for the issue of capital as redeemable; the holding of annual meetings, instead of half-yearly ones; for increasing the number of Directors; to authorize the payment of superannuation and other allowances and pensions to officers and employees of the Company; to empower the Directors to appoint a managing-director or managing-directors, and to fix the remuneration of the Secretary; to permit the use of specified lands for the purposes of the undertaking; and to regulate the supply of gas.

Mablethorpe and Sutton Gas Company, Ltd.—The Company are going to apply to the Board of Trade for a Provisional Order to confer upon them further capital powers; to remove or alter any limit on the rate of interest or dividend already prescribed on borrowed money or preference capital; and to define the minimum amounts in which any stock may be held or transferred; to empower the Company to replace out of capital, or to repay to, or to issue to shareholders shares or stock in respect of a sum of £3500, or part, or other money expended by the Company out of revenue for capital purposes; to grant powers to the Company with regard to the sale and purchase of gas in bulk; to regulate the supply of gas; to make provision as to the material, size, and strength of, and to provide for bye-laws as to, meters, pipes, fittings, and apparatus, to relieve the Company from obligation to supply in certain cases; and to authorize donations to institutions or to benevolent or other funds of the employees.

Stone Gas and Electricity Company, Ltd.—Application is to be made by the Company to the Board of Trade for a Provisional Order to extend their limits of supply so as to include the parishes of Eccleshall, Swynnerton, Chebsey, and Cold Norton; and (if thought fit) to alter or to provide for different rates, rents, and charges in different portions of the area as so extended.

Wallingford Corporation.—The Corporation will seek from the Ministry of Health a Provisional Order to enable them to extend the existing gas-works and construct new works; to acquire further land; to supply gas within a specified area; and (if necessary) to increase the maximum price from 5s. to 6s. per 1000 c.ft.

Watford Gas Company.—Authority for the construction and maintenance of additional gas-works on land specified is to be asked for by the Company in a Board of Trade Provisional Order. The Company will also ask to be empowered to form a special purposes fund, in place of the insurance fund already authorized; to regulate the supply of gas; to vary the prices charged for gas according to the purposes for which it is used, and to make provision in regard to the charges for gas supplied by prepayment meters; to permit annual, instead of half-yearly, meetings; to enable the Directors to fix the remuneration of the Secretary; to empower them to make superannuation allowances and pay pensions to offices and employees; and to increase the borrowing powers.

LEGAL INTELLIGENCE.

APPLICATION TO VARY A WAGES RATE DISMISSED.

Workers' Union v. Elland-cum-Greetland Gas Company.

There was heard by the Halifax Munitions Tribunal last Thursday—Mr. W. Ramsden, of Huddersfield, in the chair—a case in which the Elland-cum-Greetland Gas Company were summoned by the Workers' Union for failing to pay the prescribed rate of wages.

Mr. JOHN W. SWIFT (the Elland Organizer) represented the Workers' Union; and Mr. S. S. OGILVIE (of the Federation of Gas Employers) appeared on behalf of the Elland Gas Company.

Mr. SWIFT, in opening, said the case affected 23 men; and his claim was that the Company had not paid the prescribed rate of the district. The stokers had the prescribed rate, but the labourers had not. For practically every other trade in Elland the prescribed rate of wages was paid. He had done all he could with the Company from time to time, and made application for this rate. He had also met them, and interviewed them, but had not been able to get the prescribed rate of £3 3s. 1d. a week for labourers.

The CHAIRMAN: How are you going to establish your claim—by award, by regulation, or by verbal evidence?

Mr. SWIFT: The awards with regard to the Elland Gas-Works are the same as those for all the other gas-works. So far as the Calder Valley district and Halifax are concerned, the pre-war rate in Halifax was £1 7s. 7d.; and since then they have had 28s. 6d., *plus* 12½ p.ct. bonus, making £3 3s. 1d.; Sowerby Bridge are in exactly the same position.

The CHAIRMAN: Is Elland in the Halifax district?

Mr. OGILVIE: It never has been considered in the Halifax district, until Mr. Swift alleges it should be so.

Mr. SWIFT: It does not matter whether we take Halifax or Calder Valley. The rate applicable to the Calder Valley is the rate applicable to Elland. Practically all the awards have been dealt with on the rate of the Calder Valley. We have Calder Valley Wages Boards in regard to wages.

The CHAIRMAN: You must prove the prescribed rate.

Mr. SWIFT said he had a letter from Halifax on the subject, and Mr. Kaye as a witness.

The CHAIRMAN: We must have the award, regulation, or verbal evidence to show what the rate is for Elland.

Mr. OGILVIE: I have copies of the award, certified by the Ministry of Labour, for the gas industry, and am willing they should go in.

Mr. SWIFT: We ought to have the prescribed rate for the Calder Valley for gas-works in the Calder Valley. Mr. Kaye can prove the prescribed rate so far as Sowerby Bridge is concerned.

The CHAIRMAN: You must prove that Elland is bound by the Sowerby Bridge rate.

Mr. SWIFT: Elland is bound by the Sowerby Bridge rate so far as the Councils are concerned.

Mr. OGILVIE: I do not admit that for a moment.

The CHAIRMAN: We must have it proved strictly. This is a penal offence which is alleged.

Mr. SWIFT then applied for an adjournment, in order to produce witnesses to prove that Elland was governed by the Calder Valley.

Mr. OGILVIE objected, remarking that he had come from London to fight the case for the Federation of Gas Employers, to which the Elland Gas Company belonged. It was a case of great importance. He could prove by witnesses that every single national award and national agreement had been adhered to, to the last penny, by the Elland Gas Company; and he could show other privileges they had given the workmen. Before the war, there was always this distinction between Halifax and Elland; and the figures as existing to-day were merely automatic increases given by the national awards to the differences formerly existing. People could not be brought into Court, without any evidence at all, on a penal charge like this. The first letter sent by Mr. Swift from the Workers' Union was dated Aug. 26, and was in the following terms.

> "I am instructed to make application to you for the prescribed rate of wages for labourers at your works (which in our opinion is the minimum rate of wages in this district). The said minimum

is £3 3s. 1d. Seeing you have accepted the principle of hours and wages as laid down by the Gas Council, I respectfully request that the said rate paid in other districts be paid in this district from the date it became due—namely, Feb. 1, 1919."

They could produce no evidence other than the opinion of the Workers' Union as voiced by Mr. Swift. The difference was that at Halifax labourers were now paid £3 3s. 1d., and in Elland they were paid £2 18s. 9d. On the other hand, the Elland Council paid their labourers £2 14s. 3d. a week. Where was the prescribed rate? There was a certain clause in the national award dated Feb. 25 which he thought might assist the Court.

The CHAIRMAN (to Mr. Swift): Will you accept this award of the Court of Arbitration of Feb. 25?

Mr. SWIFT: We have accepted the award, and the Company have paid in accordance with it. It operates for four months from the date of it.

The CHAIRMAN: Where is your authority for saying it was for four months?

Mr. SWIFT: I have no authority. I have no witnesses.

The CHAIRMAN: The award put in is binding. What evidence is there of any other award or regulation which prescribes differently from this award?

Mr. SWIFT: I have nothing.

The CHAIRMAN: Unless you have anything else to put forward after the award has been put in and you have accepted it, there is no case.

Mr. SWIFT: I have nothing further to say.

The CHAIRMAN: I do not think an adjournment would be of any service to you in that case. Have you applied for arbitration?

Mr. SWIFT: No. These people are very dissatisfied that they have not the same prescribed rate of wages as in the Calder Valley.

The CHAIRMAN: If they are dissatisfied, why do not they take the course of applying for arbitration, and get the rate increased?

Mr. SWIFT: I think they will have to do so. We want all wages alike, with regard to gas and every other industry.

The CHAIRMAN: You are trying to use this Court to alter the rate of wages, and the Court is not for that purpose.

Mr. OGILVIE said a memorandum of the Ministry of Labour suggested that in case of dispute they should go before the National Joint Industrial Council, who had been doing excellent work.

The CHAIRMAN repeated that the Court was not established to alter wages for any industry, but only to try offences under the Act; and there had been no offence at all. The case had not been established; and it would be dismissed, with £3 3s. costs.

PLACE OF ORIGIN OF GAS-MANTLES.

The question of the origin of a number of cases of gas-mantles, alleged by H.M. Commissioners of Custom and Excise to have been of enemy origin, and seized by them in 1915, was settled by Mr. Gill at the Tower Bridge Police Court on Friday last in favour of a Dutch manufacturer named Beudeker, of Arnheim, Holland.

The case has been pending since 1915; and it was only on the conclusion of the armistice that it was possible for the complainant to issue summonses against the Customs authorities, calling on them to show cause why the seized mantles (some 60,000 altogether) should not be given up.

Mr. DART, the Solicitor for the Commissioners, said that at one time during the war the import of incandescent gas-mantles was prohibited. Later, permission was given to import them provided they did not contain more than 25 p.ct. of material of enemy origin. Expert examination by Mr. Robin, of Streatham, and Mr. Bark, of the Welsbach Company, showed that, of a number of cases of mantles seized, some contained more than 25 p.ct. of thorium nitrate and ramie thread; both articles being supplied from Germany before the war.

Defendant, supporting his claim, said, in answer to Mr. KEEVE, that he extracted the larger part of his thorium nitrate from the ash of old gas mantles, and that he had used American cotton, woven in Holland, for the frames of the mantles.

Mr. GILL said he thought Mr. Beudeker had made out his case, and ordered the mantles to be given up. He ordered the Customs to pay 25 guineas costs.

A Gas Stealing Charge.

The Loughborough Magistrates have committed for trial at the Quarter Sessions William Spreckley, a motor engineer, on a charge of stealing £25 worth of gas belonging to the Kegworth Gas Company, who have for some time noticed a discrepancy between the gas made and sold, for which they were unable to account. Accused was stated to have bye-passed the meter and connected the main direct to a gas-engine used for generating electric current. The loss to the Company was put down as being probably from £75 to £100 a year.

Hasland Coking Company.—With a capital of £100,000 in £1 shares, the Hasland Coking Company, Ltd., has been registered to acquire the business of a company of the same name, and to carry on operations as coke-oven proprietors, and manufacturers of coke, gas, tar, pitch, benzol, ammonia, and other products, &c.

Gainsborough Gas-Works Loss.—The fact that there is a continued loss on the Gainsborough Gas-Works, and that the price of gas is now 7s. per 1000 c.ft., determined the Council to call in an expert, with a view to ascertaining how better results could be obtained. His report has now been presented: and it is stated to contain suggestions which, if they are carried into effect, will mean practically the re-modelling of the works.

MISCELLANEOUS NEWS.

LONDON COUNTY COUNCIL APPROVAL OF THE FUEL RESEARCH BOARD REPORT.

In a report to be presented at to-day's meeting of the London County Council, the Public Control Committee refer to the report of the Fuel Research Board, the recommendations contained in which they summarize, and quote in full the amendments subsequently agreed to. Of these they express their approval, in the following comments:

With regard to the proposal in Recommendation IV., to allow freedom to a gas company to decide the character of the gas they will supply, it was pointed out at the conference, on behalf of the Council, that considerable advantage would ensue from the adoption of a uniform standard of gas by all gas companies supplying the area of Greater London. The question appeared to be outside the purview of the Board; but we are strongly of opinion that the advantages of such a course are so considerable that it is to be hoped that the several gas companies supplying this area will have regard thereto in exercising the freedom which the scheme proposes to give them. We accordingly suggest that the Board of Trade should be asked to use its influence with the several gas companies supplying in the area in question with a view to effecting this desirable object.

The Council will note with satisfaction that Recommendation IV. also proposes to place limits on the amount of inert constituents which gas may contain. The reason for prescribing a graduation in such limits is that, in many cases, gas-making plant has fallen into disrepair during the war, and that some time must necessarily elapse before the plant can be brought up to pre-war efficiency. The establishment of this principle should be to the advantage of London generally, and in particular to consumers in districts beyond those of the three large Metropolitan Companies. In some of such districts the gas has been notoriously poor in quality.

With regard to the concluding recommendation—viz., that the unit to be adopted in charging the consumer should be 100,000 B.Th.U.—the Fuel Research Board point out that the gas-meter would continue to be the measuring instrument between consumer and producer, and that the conversion of cubic feet into thermal units would be easily and accurately made by the use of conversion tables. Under present conditions the gas must be measured by the meter in the present manner, but its terms in volume converted into terms of heat. For instance, if a gas company declared its intention to supply gas of a calorific value of 550 B.Th.U. per cubic foot, taking the standard price as 4s. 7d. per 1000 c.ft., the equivalent price per 100,000 B.Th.U. would be $\frac{100,000}{550,000} \times 55d. = 10d.$ Thus, assuming the standard price of 10d. per 100,000 B.Th.U. was charged, a consumer using 10,000 c.ft. of 550 B.Th.U. value would use 5,500,000 B.Th.U., and would be charged $\frac{5,500,000}{100,000} \times 10d. = 550d. = £2\ 5s.\ 10d.$ If gas of 520 B.Th.U. were supplied, the charge would be $\frac{5,200,000}{100,000} \times 10d. = 520d. = £2\ 3s.\ 4d.$ If gas of 580 B.Th.U. were supplied, the charge would be $\frac{5,800,000}{100,000} \times 10d. = 580d. = £2\ 8s.\ 4d.$ Under the existing system of charging, the charge would in each case be 4s. 7d. × 10d. = £2 5s. 10d.

We understand that the Board of Trade will now proceed to initiate legislation to give effect to the recommendations of the Fuel Research Board; and it is to be presumed that the Board of Trade and the gas companies will endeavour to adjust the price of gas to present conditions of working costs. It will then be for the Council to ensure, as regards the London Companies, that the relations previously existing between standard price, standard dividend, and standard quality is maintained.

After full consideration of the whole question, we are of opinion that, speaking generally, the recommendations of the Fuel Research Board mark a decided advance, from the point of view of the consumer, in the method of gas supply; and we think that the Council should express its approval of the Board's revised recommendations. We accordingly recommend:

(*a*) That the Council approves generally the recommendations of the Fuel Research Board on Gas Standards as revised on the 28th of October, 1919, at a conference at the Board of Trade, between representatives of the several interests involved.

(*b*) That the foregoing resolution (*a*) be communicated to the Board of Trade, and that the Board be asked to use its influence with the several gas companies supplying within the area of Greater London to secure the adoption by them of a uniform calorific standard for gas in such area.

Kegworth Gas Company's Powers.—Complaining about the gas supply of Kegworth at a meeting of the Castle Donington Rural District Council, Mr. Hopewell said there had lately been an improvement; but the position was still unsatisfactory. Only a few days ago one of the local manufacturers had to send girls home for several hours because there was not sufficient gas. The manufacturers were doing their best for the place; and the Gas Company were pulling them back. He wanted a definite answer as to whether the Kegworth Gas Company possessed statutory powers. The Council had requested them to forward such documents for inspection, if they held them. The Clerk said he had communicated with the Clerk of the Peace on the subject, and he had made a thorough search for any statutory powers which were possessed by the Company, but could not find any. As the official could not find any trace of them, it was quite certain the Company had no such powers. The facts had been communicated to the Ministry of Health. It was decided to await the reply from the Ministry.

GAS PURCHASE QUESTION AT SHEFFIELD.

Council Discuss the Proposal.

Last Wednesday there was held a special meeting of the Sheffield City Council, to consider the proposed purchase of the gas undertaking. The LORD MAYOR (Mr. S. Roberts) presided over a large attendance of members; and much interest was evinced by the general public in the proceedings.

Sir WILLIAM CLEGG moved: "That in the opinion of this Council it is desirable that the undertaking of the Sheffield Gas Company be acquired by the Corporation on the terms now mentioned; that an agreement for that purpose be entered into and sealed with the Corporation common seal; and that the Parliamentary and General Purposes Committee be instructed to take the necessary steps for the promotion of a Bill in Parliament in connection with such acquisition." He said the development of the gas undertaking in the future would not be in the direction of lighting, but for cooking, heating, and industrial purposes; and it seemed to him that Sheffield was somewhat favourably situated with regard to this. Gas could be utilized for industrial purposes to such an extent as to make it fairly remunerative if the Corporation took it over. He believed that up to the time of the war the gas undertaking was a splendid commercial success, complying with all the requirements placed upon it by Act of Parliament. It was in a position to offer gas to consumers cheaper than any other undertaking throughout the country, with one exception. For years the Company were able to pay the maximum dividend of 10 p.ct. allowed by Statute. He also knew that the undertaking was at that time exceedingly well managed, and that its financial position was sound. If the undertaking was to-day not in the position it was then, it was not owing to mismanagement, but to extraneous matters for which the officials were not to blame in the slightest degree. Every gas company in the country had been severely handicapped by the restrictions imposed by the Minister of Munitions; and there had been an enormous increase in wages and cost of raw materials, together with difficulties of labour. Remembering all these things, he thought they ought not in fairness to regard the position of the Gas Company during the four or five years of war as being the correct one. Possibly it would be much fairer to take the period immediately preceding the war. He had looked at the thing purely from the point of view of what was best in the interests of the citizens of Sheffield—not how it would affect the gas shareholders or officials—as to whether there was a reasonable prospect of the undertaking being remunerative and bringing something into the common fund. Speaking generally, the experts from the commercial side, and the machinery, plant, and building sides, had found the undertaking in a fairly satisfactory condition, notwithstanding all the trouble and all the disadvantages of the past four or five years. Of equal importance with the production of gas was the disposal of bye-products. Taking all the facts into consideration, he thought it would be to the advantage of the city that the gas undertaking should be taken over and controlled by the public authority. According to the proposed scheme they would not have to find the actual cash to pay for the undertaking. They would only have to give the shareholders 5 p.ct. annuities payable for a fairly extended period. In this way, they would get over a very considerable difficulty. He had the same confidence in recommending the Council to purchase the gas undertaking that he had in recommending them to purchase the water, tramways, and electric light undertakings.

Alderman CATTELL formally seconded the resolution.

Mr. ABRAHAM moved an amendment to delete from the resolution the words "on the terms now mentioned and that an agreement be entered into." He did so, he said, not because he was opposed to the Corporation acquiring the gas undertaking, but because he believed it would mean a financial burden on the people of the city. Looking through the report which had been circulated, he observed that last year the Company had paid a dividend of £67,000. Not more than 3½ p.ct. could be paid in dividends; and yet the proposal before the meeting was that they should pay the shareholders 5 p.ct. This meant an increase in dividends to the present shareholders of something about £30,000 per annum. In addition, the Corporation would be compelled to set aside a sinking fund. He and others wanted to know what exactly was the state of the undertaking which they were asked to purchase. Up to now they had not been able to receive any satisfactory assurance that the present gas plant was an up-to-date one, or whether it required considerable expenditure. With regard to taking over the whole of the officials and staff of the Gas Company, he agreed that this was reasonable, provided the other terms were right. But it was peculiar that the General Manager of the Gas Company was to be guaranteed a maximum salary of £2500 a year when their own permanent officials were fixed at £1500. On the present terms, it was probable that there would be an increase in the price of gas; and, this being so, he believed the citizens of Sheffield were not behind the proposal, and would not sanction it until they knew more about it.

Mr. BARTON seconded.

Alderman STYRING said it was no use attempting to discuss the matter on the lines of Mr. Abraham's speech. The Directors had made certain proposals on which they were willing to transfer the undertaking to the city; and the Council had to take it on these terms or reject it. Arbitration was not open to them. For fifty years the Corporation had been desirous of acquiring the gas undertaking; and this was the first opportunity they had had of obtaining it on anything like reasonable terms.

Alderman WARDLEY said they were told that for over fifty years there had been attempts made to purchase the gas undertaking; and there had been no willingness on the part of the Company to part with it. The reason was that they always had their solid 10 p.ct. dividend. Now they had to drop their dividend. Might not this have a great deal to do with their decision to sell, and was it not enough to make

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the Council think of what they were being asked to do? According to the proposed terms, too, they were to guarantee the shareholders a maximum dividend which the undertaking was not making to-day.

Mr. BLANCHARD said it was not correct that the first offer of the Gas Company had been accepted. The terms first offered had been considerably modified. He was convinced that they could not get any such terms as had been offered by going to arbitration. The capital of the Company to-day was moderate as compared with the quantity of gas sold; while the price of the gas was low in comparison with that of similar undertakings. The works as a whole were sufficient, substantially designed, and ample for present requirements. There was also a good margin for further developments.

Sir WILLIAM CLEGG pointed out that they could not compel the Gas Company to sell. He had no objection to referring the question of better terms to a larger and more representative Committee. The idea was that they agreed to the principle of purchase—the price to be settled subsequently.

Mr. A. NEAL, M.P., declared himself in favour of purchasing the undertaking. He did not think there was any real chance of getting a substantial reduction on the price; but there was a very good case for a reasonable postponement. They ought to seek the judgment of their fellow citizens.

Mr. LAMBERT was opposed to the price which was at present offered. It was going to cost the city at least £2,000,000; while the value of the assets on the books on Dec. 31, 1918, was £1,124,743.

Mr. WOMERSLEY thought the question should be referred to a plebiscite of the people of Sheffield, among whom there were very mixed feelings on the subject. He also expressed the opinion that the amount of capital which would be required to purchase the undertaking should be devoted entirely to pushing forward their own electrical undertaking, and pushing the Gas Compauy out of existence altogether.

Alderman CATTELL said it was quite apparent from the discussion that it would be impossible to carry the amendment proposed by Mr. Abraham or the proposition of Sir William Clegg. Personally he was in favour of the purchase of the Gas Company; but in view of the discussion, he thought it would be wise to defer the matter until they had had further negotiations with the Company. He realized that the new members of the Council, who had not had the opportunity of being with them in the past, had not grasped the full meaning of the negotiations. Sir William Clegg and himself had agreed to withdraw the original resolution; and Mr. Abraham was willing to withdraw his amendment, and had agreed to a resolution stating that in the opinion of the Council it was desirable that the gas undertaking should be acquired for the city, but that the question of the terms on which it might be obtained be adjourned until more information was available.

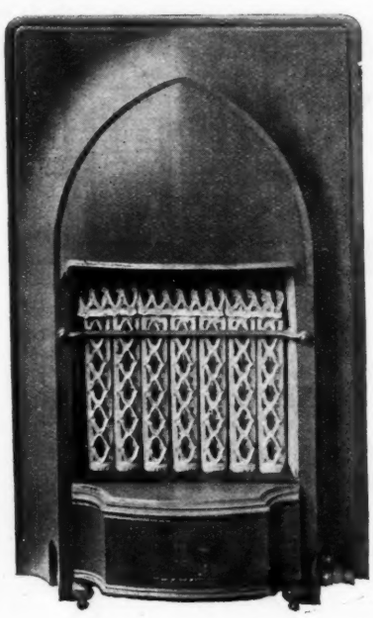
Alderman Cattell's resolution was carried by 31 to 16, with two neutral.

The Calne Town Council are reported to be negotiating for the purchase of the local gas-works.

TORONTO CONSUMERS' GAS COMPANY.

The 71st annual report of the Directors of the Consumers' Gas Company of Toronto, covering the year ended Sept. 30, stated that, considering the exceptional difficulties under which the working of the Company was carried on during the year, the results could not be regarded as other than satisfactory. While the profit and loss statement showed an adverse balance of $127,064, after payment of interest charges and dividends, and after making the statutory provision for the plant and buildings renewal fund, it must be borne in mind that the recent increase in the price of gas had been effective during only one month of the period covered by the statement. The Directors did not feel warranted in increasing the rate charged to gas consumers until such time as it could be definitely shown that an increase was necessary. The Company's Act of Incorporation provided that any sum or sums drawn from the rest or reserve fund to meet the requirements of the Company should be restored from time to time out of the earnings of the Company; and it was confidently anticipated that the earnings for the current year would be quite sufficient to enable the Directors to restore to the reserve fund the amount above referred to. The present prices of the three items of coal, oil, and operating wages represent a total increase for the year of $1,114,677 upon pre-war figures. More than 4000 new customers had been added during the year. While the use of gas for the manufacture of war munitions had been discontinued, many large and important installations of furnaces, steam-boilers, crucibles, ovens, &c., using gas as fuel, had been made in establishments engaged in peace-time industries; and the increase in the consumption of gas for these purposes was very large. The Directors were proud of the record made by the Company's employees in the war. Of the 414 employees on military service overseas, 51 had been reported dead. Opportunity had been afforded every returned man who was in the Company's employ at the time of his enlistment to re-enter the service; and now 279 of the Company's employees were returned soldiers.

The PRESIDENT (Mr. A. W. Austin), addressing the proprietors at the meeting, declared that they could have had many more new consumers, had the Company possessed the facilities to look after fresh business. It would be necessary in the near future to consider the enlarging of the plant, and the extension of the mains, so as to keep up with the constantly increasing demand for gas. Incorporated in 1848, the Company had had a record of uninterrupted growth and prosperity. While the dividend was limited to 10 p.ct., payment of this dividend was a fixed charge upon the earnings; and the price of gas was regulated by the accumulation of surplus earnings after the full dividend had been paid. Whenever the revenue was insufficient to meet the requirements of the Company, including the dividend, the price of gas must be adjusted accordingly. This was what had happened in the past year. The continued rise in the price of materials and labour has rendered necessary an increase in the price of gas.



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With this increase, the revenue would be raised to a point where all the Company's obligations would be covered; and the revenue would provide as well for the small adverse balance of the past year. Even the increased price of gas in Toronto was lower than that prevailing in most American cities, notwithstanding the fact that in Toronto oil, coal, and other raw materials, being subject to import duty and extra freight rates, were much higher.

The GENERAL MANAGER (Mr. Arthur Hewitt) said the Company occupied a high place among public utility companies of the Continent. A notable feature was the extremely low capitalization compared with the capacity of the manufacturing plant and distribution system, the extent to which the output of gas had been developed, the efficiency of the service given, and the liberality of the policy in the matter of extensions into new territory. At the beginning of the war so well was the Company's extension programme advanced, that the increase in business during the period of the war had been taken care of with very slight extensions being necessary, either in the manufacturing plant or in the distribution system. In view of the tremendously increased cost of iron and steel products and building materials generally, and the advances in labour rates, the saving to the Company in having so fully anticipated the future requirements could be easily appreciated. From this point on, the probable trend of prices was, of course, a matter of conjecture. The policy of the Company during the war would be continued, as far as circumstances made necessary, and only such extensions as were absolutely required would be undertaken until the time when some sort of stability in prices had been reached. The retarding of extensions was not a policy which would be chosen, except in emergency; but when it was realized that plant and buildings erected and installed at abnormal costs would sooner or later lose a part of their value, a conservative policy of extension was quite justifiable. There were two general methods of control of a public utility company like this. One was to limit the price or tariff to be charged to the consumer; the other, to fix the dividend to be paid to the shareholder. He had no hesitation in giving it as his opinion that the latter plan was the best in the long run. The stock of such a company became the equivalent of a bond with a fixed rate of interest; and the market price of the security would vary only as the value of money varied.

Redcar Council and the Gas-Works.—Addressing a meeting at Redcar last Thursday, Major J. S. Crone, J.P. (the Chairman of the Council), set forth the case for the purchase of the local gas-works. Anyone who examined the figures, he said, would be convinced that the Council had made a very satisfactory purchase. If the Council had gone about the matter in a somewhat unconventional way, it was because the circumstances demanded prompt action. Had they approached the business in the ordinary manner, the probabilities were that the opportunity of securing the undertaking on favourable terms would have passed. The opposition to the purchase had been of a nebulous character, and did not give definite ground for reply.

POWER TRANSMISSION BY GAS.

Gas and Electricity Compared.

In the November issue of "The Times" Engineering Supplement, an Engineering Correspondent made a comparison between power transmission by gas and by electricity—putting forward figures of cost which will be found of interest. The following is taken from the article.

One of the objects aimed at by the proposal to provide a general supply of electricity distributed from sixteen huge generating stations is to get rid of the cost of conveying coal to each individual factory. But why is it taken for granted that electricity is the only agency whereby the carriage of coal may be eliminated? Why has not the possibility of using gas for the purpose been at least considered. The idea of conveying energy to great distances by means of electricity is familiar. It looks a simple matter to string a wire to any distance, and send power along it in any desired quantity. But where the distance is great and a large amount of power is required, the "wire" is apt to assume formidable proportions, and the loss by the way is by no means negligible. Let us take as a definite example the transmission to London of (say) 240,000 KW. generated in the Yorkshire coalfields, some 173 miles away.

ELECTRICAL TRANSMISSION.

The size of the conductors and the efficiency realized will obviously depend on the mode of transmission adopted and the voltage at which the current is delivered to the line. As regards method, there is little doubt that the transmission would be on the three-phase system. In America and elsewhere long-distance transmissions at potentials of 100,000 volts and more have been in operation for years; but in this country the distances are short, and the voltages employed (so far as the writer is aware) do not exceed 30,000. For a 173-mile transmission, it is practically certain that the voltage would be higher than 30,000, and not more than 100,000; and it will be instructive to see how the transmission works out in these two extreme cases.

If the current density is 1000 amperes per sq. in., the drop will be 7330 volts per line, or (say) 12,700 volts between phases. With an initial potential of 30,000 volts, the terminal pressure will be only 17,300 volts, and the loss in transmission 42·3 p.ct., which is out of the question. With a current density of 500 amperes the drop between phases will be reduced to 6350 volts, or 21·2 p.ct., giving a terminal pressure of 23,650 volts. The loss is still very high; but at the voltage stated it could be reduced only at the cost of an enormous expenditure in copper. To deliver 240,000 KW. in London at 23,650 volts the current would be 6518 amperes, requiring (at 500 amperes per sq. in.) 13 sq. in. of copper per line, or 39·1 sq. in. in all. If the conductors were solid, each would be $4\frac{1}{16}$ in. in diameter—a very respectable

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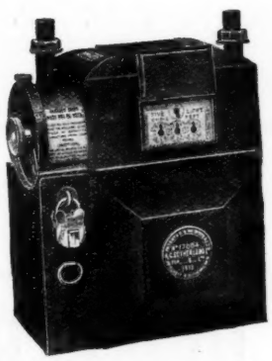

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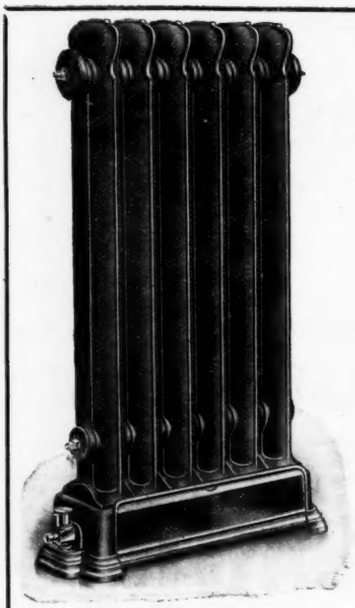

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4	40½ in.	18 in.
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Enquiries invited also for other sizes of "STEAMLESS" Radiators, and for Davis "LUMINOUS," "FACTORY," and "SAFETY GARAGE" Radiators.

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"wire." At 9 tons per sq. in. per mile, the three lines would weigh 352 tons per mile, or about 61,000 tons in all. Working, however, at 100,000 volts, the current would be reduced to 1766 amperes, the area of the conductors (at 1000 amperes per sq. in.) to 5·3 sq. in. in all, and their weight to 47·7 tons per mile, or 8250 tons in all. The drop would then be 12,700 volts, or 12·7 p.ct., and the current would be delivered at 87,300 volts.

Cost of Gas-Pipe Line.

Now let us glance at the other alternative, and, instead of transmitting the energy in the form of electricity, carbonize the coal at the pit's mouth, pipe the gas to London, and generate current there by means of gas-engines. The amount of gas required to yield 240,000 KW. will be about 5,000,000 c.ft. an hour, or 84,000 c.ft. a minute. A 24-in. steel pipe will convey this gas with an initial pressure of 300 lbs. per sq. in. The wall of the pipe will be $\frac{5}{16}$ in. thick at the compressor end, reduced to $\frac{1}{4}$ in. as the pressure drops. It will weigh from 160 to 200 tons per mile, or about 32,000 tons for the whole line—just one-half the weight of copper required to transmit the same amount of energy at 30,000 volts, or four times that for a 100,000 volt transmission.

But the price of electrolytic copper to-day is about £125 per ton, while steel tubes can be bought for (say) £30. The metal required for transmission by gas will therefore cost less than that for electric transmission, even at 100,000 volts, and only about one-eighth of that required at the highest pressure which has yet been employed in this country. Aluminium might be used instead of copper; but this metal also is more expensive than steel.

As to the loss of energy in a scheme of gas transmission. To compress 84,000 c.ft. a minute to 300 lbs. per sq. in. will require some 21,726 I.H.P. If the mechanical equivalent of the 240,000 KW.—viz., 321,674 H.P., is added to this, the total becomes 343,400 H.P. Of this total only 21,726 H.P., or 6·3 p.ct., is expended in the transmission, as against 21·2 and 12·7 p.ct. respectively with electricity.

No doubt great economies might be effected in the manufacture of gas by generating it in the coalfields in large works on the most modern lines, instead of in a multiplicity of works of all sizes and types, most of them occupying expensive and highly-rated sites, scattered throughout the length and breadth of the country, and having to transport every ton of their coal. The cost of bringing to London the coal used by the Gas Light and Coke Company was given last July by the Governor to the President of the Board of Trade as 12s. 9d. a ton. For last year's consumption, this would work out at £1,187,000, or equivalent to 10⅜d. per 1000 c.ft. of gas sold. The money spent on the carriage of one year's coal would have paid for a main large enough to bring from Yorkshire the whole of the gas made by the Company during the year.

The potentialities of gas transmission being so enormous, it is strange that gas has not been considered as an alternative to electricity in connection with the vast schemes of power supply which have recently been brought forward.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Dec.* 1.

In the London market the demand for pitch continues. The price is very firm at over 80s. per ton net in bulk. Creosote continues in request, and is advancing in value; the present price being about 7d. per gallon net in bulk. Pyridine is quoted at 4s. 9d. to 5s. per gallon net. Pure benzol and pure toluol are from 2s. 9d. to 3s. per gallon. Solvent naphtha (95-160) is 2s. 9d. per gallon net.

For December delivery, the price of sulphate of ammonia to farmers is £21 per ton, basis 24½ p.ct., with an increase of 4s. for each ¼ p.ct. of ammonia, and with a discount of 10s. per ton to dealers.

Tar Products in the Provinces.

Dec. 1.

The average values for gas-works products during the week were: Gas-works coal tar, 40s. to 45s. Pitch, East Coast, 70s. to 72s. 6d. per ton f.a.s.; West Coast—Manchester, 62s. 6d. to 65s.; Liverpool, 62s. 6d. to 65s.; Clyde, 72s. 6d. to 75s. nominal. Benzol 90 p.ct., North, 1s. 8d. to 1s. 10d.; crude 65 p.ct. at 120° C., 1s. 0½d. to 1s. 1½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 2s. 8d. to 2s. 9d. Heavy naphtha, North, 2s. 2d. to 2s. 3d. Creosote, in bulk, North, liquid, 6d. to 6¼d.; salty, 5d. to 5¼d. Heavy oils, in bulk, North, 6½d. to 7d. Carbolic acid, 60 p.ct., 1s. 11d. to 2s. Naphthalene, £18 to £22; salts, £6 to £7, bags included. Anthracene, "A" quality, 7½d. to 8d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

Considerable astonishment and confusion have been caused by the reduction in the price of coal for household purposes; and the general view seems to be that the scheme is impracticable. It is impossible that industrial coal should remain long at the old prices if house coal is to be sold at 10s. less. Already it is stated that gas companies are to receive supplies at the reduced rate; but information is lacking regarding coke-ovens. It is this kind of uncertainty which affects the bye-product markets. So far, however, prices are firm. Pitch is particularly strong in London, and forward buyers are numerous at late highest rates. Sellers prefer to do nothing, and have to be tempted to take an order by more money. Crude tar has advanced again at

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"MARS" Gas-Heated - Steam - RADIATORS

WITH PATENT AUTOMATIC GAS-CONTROL VALVE.

Heat a room or building with less gas than would be required to properly light it.

They are self-contained, only need a gas-supply connection, and maintain an agreeable even temperature; at the same time the Gas Consumption is quite moderate.

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the ovens, and is almost certain to command current rates for quantities sold on straight contract during the next six months. Creosote still appears to be below its real value. The demand from the Continent is increasing; and it is worth noting that the c.i.f. price is much above that realized by producers with rail freight and other charges included. This suggests that an improved method of handling the trade would be advantageous. There has been a sudden advance in crude carbolic acid, and crystal is almost without change, although there cannot be much profit in making it at current rates. Solvent naphtha is scarce and strong, and in some Provincial centres it is impossible to meet the demand. Naphthalenes exhibit no fresh feature. Benzol is scarce; the supply of crude being insufficient to keep refiners fully occupied. Prices which have to be paid for crude do not, however, accord with the price of the refined spirit, which, of course, is kept from rising by the price of petrol. At the same time, it is thought that next season an increase in price should be possible. The Association now handles a large percentage of the total output, with which demand keeps well in line. Anthracene is dearer.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 10½d. North; crude, 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 2s. 2d. per gallon nominal; crystals, 40%, 9d. per lb.

Crude Tar: London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton *ex* works. Refined tar, 32s. 6d. per barrel (free) on rail.

Pitch: London, 80s. to 85s. per ton; East Coast, 72s. 6d. to 77s 6d. per ton; West Coast, 72s. 6d. to 75s., with Manchester 72s. per ton and Glasgow 72s. per ton; South Wales, 75s. to 80s. per ton.

Solvent Naphtha: London, 3s. Provinces average 3s. 1d. per gallon.

Crude Naphtha: Naked, 9d. per gallon.

Heavy Naphtha: 2s. 6d. per gallon.

Naphthalene: Refined, £18 to £20 per ton nominal; crude, £6 10s. to £11, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d. Pure, 3s.

Creosote: London, 7¼d.; North, 6d. to 6½d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 3d. per lb.

Cresylic Acid: 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

A good home demand is still reported for this material; the gradually ascending scale of prices—£21 per ton for December rising to £22 in March—bringing orders in earlier than would otherwise be the case. Difficulties of delivery also have some effect; farmers wishing to make sure of supplies being on hand if they need them. The export position is slack at the moment, in spite of the price being a good one. The reasons for this are probably, first, that there is very little material available after home requirements are satisfied and, secondly, such business is hindered by the position of the Continental exchanges.

Irish Towns in Darkness.—Drogheda gas consumers were startled last Wednesday by the Corporation announcement that, until further notice, the gas supply would be cut off at 7 o'clock each evening and resumed at 7 a.m. The reason given was coal shortage. The enforcement of the order led to great inconvenience, especially to users of gas engines. A failure of the Tralee gas supply on Thursday night left the town in darkness.

Gas-Workers' Pay at Bradford.—The gas workers in the employ of the Bradford Corporation are henceforth to be paid at a minimum rate of 1s. 5d. per hour, except in those cases where a national agreement or an award operates. Ordinary day rates are to be paid for Sunday work, except where the day is the seventh consecutive day worked, or where the work performed is of an emergency nature, in which cases double time will be paid.

Birmingham Gas Supply Criticized by the Chamber of Commerce.—On the 21st ult., a deputation from the Birmingham Chamber of Commerce, authorized by the General Purposes Committee, waited upon Alderman J. H. Lloyd, who was accompanied by Mr. A. W. Smith (Secretary and Manager of the Gas Department), Dr. E. W. Smith (Chief Chemist), and Mr. R. J. Rogers (Superintendent of the Fittings Department), with regard to complaints made by members of the Chamber as to the inadequacy of the gas supply for the purposes of the manufacturing industries of the city. Alderman Lloyd explained the difficulties which now confront the department, and said that steps were being taken to overcome the naphthalene trouble. The difficulties which originated with the war were exceptional in their character, but every effort was being made to remove them with the least possible delay. The deputation expressed the hope that the work of the department would be successful.

Gas Complaints at Grimsby.—At the monthly meeting of the Grimsby Town Council, Mr. Stanley moved that, "as the question of the lighting of dwelling houses is a subject of public importance, the Council desire to call the attention of the Grimsby and Cleethorpes Gas Companies to the numerous complaints made by householders as to the gas at present supplied, and request the companies to effect an immediate improvement in the pressure and quality." The poor quality of the gas was a vexed question with the ratepayers at the present time, he said; and they were coming to the conclusion that they were either paying for something they were not getting, or else they were paying a lot too much for what they were getting. It was the duty of the Council to find out whether the gas supply could not be improved. Mr. Womersley seconded, and remarked that the companies had been allowed certain privileges in the past; but there was no reason why they should not now supply the public with improved gas. It was simply a case of profiteering. The resolution was adopted.

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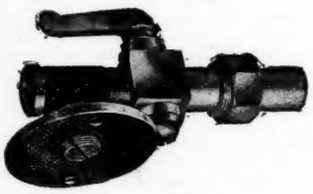
THE "UNEEK"

Two-way Tap.



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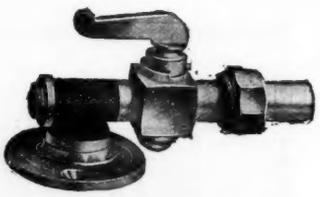
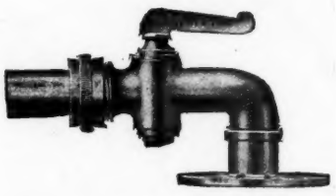
USED AS STRAIGHT-WAY TAP.

Simply alter Position of Screwed Plug.



USED AS ELBOW TAP.



Elbow Stove Tap No. 154.

SAWER & PURVES,

(BRANCH OF METERS LIMITED),

MILES PLATTING, MANCHESTER.

RADFORD ROAD, NOTTINGHAM.

Tests Regarding Gas Used for Traction.

The General Purposes Committee of the London County Council have had under consideration the report of the Inter-Departmental Committee upon the employment of gas for motor vehicles, and the supply, storage, &c., of such gas. They say the majority of the Committee's recommendations do not affect the work of the Council; but there are certain points to which they think the attention of the Council should be directed. One of the Committee's recommendations is that all possible departmental and local authority encouragement and provision for the extension of gas power and gas traction facilities should be forthcoming. The evidence before the Inter-Departmental Committee suggests that town gas as a motive power for omnibuses offers considerable saving in running expenses compared with petrol—viz., 29·5 p.ct. In this connection, the London County Council Committee point out that during the war it was necessary to use gas instead of petrol for traction purposes in the London fire brigade; but this practice is not now being followed, as it is found cheaper and more efficacious to use petrol. In regard to the recommendation that the price charged by gas undertakings for power and industrial purposes should be the same as that charged to the ordinary consumer, subject to discounts, the Finance Committee observe that it is of importance that there should be some safeguard to the ordinary lighting consumer against low and unremunerative prices being charged for gas used for industrial and power purposes. The Inter-Departmental Committee advocate the adoption of rotary, inferential, or other gas-measuring recorders, which would be advantageous in connection with the delivery of comparatively large volumes of gas in relatively short periods of time; and they recommend that sections 12 and 13 of the Sale of Gas Act, 1859, should accordingly be amended so as to give powers to the Board of Trade to approve other suitable types of gas-meters, and to prescribe rules for testing and conditions of usage. They suggest that inspectors of local authorities should have the same power of stamping and testing meters of a type approved by the Board as those conferred by the Act of 1859. The Inter-Departmental Committee further recommend that rotary meters should be tested with a "flying" start, and that they should be stamped as correct if accurate within 2½ p.ct. *plus* or *minus*, while capable of passing gas. The Council have had little experience of the latest forms of meters of this kind; but if the type is approved by the Board of Trade, the Committee are advised that it will be quite practicable for the Council's officers to test such meters, and the suggested limits of accuracy appear to be reasonable. They are not in a position to state what expenditure is likely to be involved in the provision of new apparatus or the alteration of existing plant in order to carry out the tests which may be prescribed.

Bad Coal at Stoke.—Some amusement was caused at a meeting of the Stoke-on-Trent Town Council on Thursday last, when Mr. Hancock asked if people who were willing to pay for it could be supplied with a light sufficient to read by. From information supplied by the Gas Engineer, the Town Clerk assured them that in all probability the quality of the gas would get much worse before Christmas, unless there was a marked improvement in the coal supplied.

Wages at Skipton.—The result of the arbitration award with respect to the employees' wages at the Skipton Gas-Works has been announced. All the men concerned are to receive advances of 5s. per week, payable at the rate of 10d. per hour per shift. Stokers are to receive in addition 6d. per shift worked; and all hours worked in excess of 47 per week are to be regarded and paid for as overtime. The award is retrospective from July 9 last. The Council approve of the award.

Gas Supply at Batley.—An arrangement has been made between the Birstall Urban District Council and the Batley Corporation, whereby the former authority is to sell gas to Batley at the rate of 5s. 8d. per 1000 c.ft., less 7½ p.ct. discount if the monthly accounts rendered are paid within that period. The Batley Corporation are now considering plans for the improvement of their carbonizing works, which have been held-up by the war. Powers for borrowing will, however, have to be obtained.

Retford Gas Undertaking's Mains.—The announcement of the Retford Town Council that they intend to lay down new gas-mains in some of the principal streets of the borough, at a cost of £9599, is causing some adverse comment among a section of the ratepayers, owing to the impression that this outlay will be a charge upon the rates. This impression is stated to be quite erroneous; and the Mayor (Mr. V. S. Woods), who is Vice-Chairman of the Gas Committee, has intimated that the necessary loan will be raised by the Committee, who will pay the principal and interest as a charge on the department. It is also explained that the Corporation gas undertaking has never been a charge upon the rates, but has from time to time contributed handsomely to various improvements of the town. Despite the difficult period through which the undertaking is passing, it is still self-supporting. It is absolutely necessary to lay down the new mains, in order to meet the increasing demands of the public for gas for cooking and lighting purposes.

Heston Urban District Council's Regret.—The General Purposes Committee of the Heston and Isleworth Urban District Council report that an objection was lodged on the Council's behalf to the application made by the Brentford Gas Company to the Board of Trade under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, to enable the Company to increase the price of gas to consumers to 4s. 10d. per 1000 c.ft. without being liable to reduce the dividend on their "A" and "B" consolidated stocks below 3 p.ct. and 2⅝ p.ct. per annum respectively. The Board have now intimated that they are advised that the increased price asked will not be more than sufficient to enable the Company to pay dividends at these rates, and they have accordingly made an Order in these terms. The Committee regret that this decision was arrived at by the Board without any public inquiry, and without the objectors being heard on the matter, and have directed that a letter be sent to the Board expressing the Council's surprise and regret at their action.

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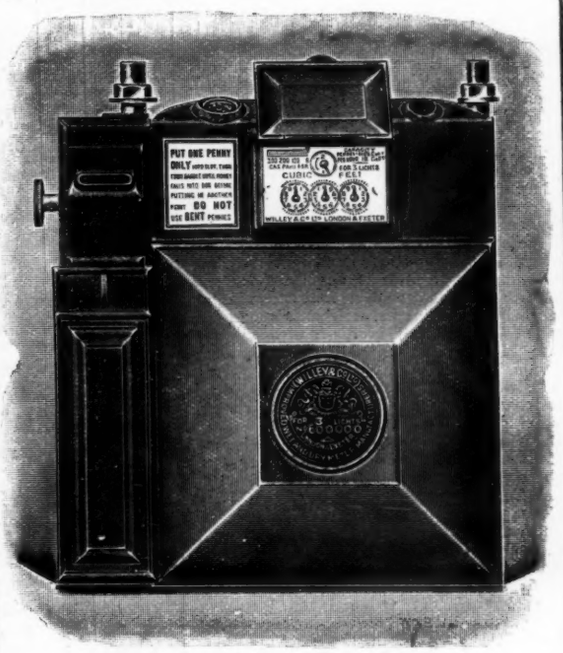

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Meter Inspectors' Demands at Rochdale.—A Sub-Committee of the Rochdale Corporation Gas Committee have issued a report on an interview with a deputation of meter inspectors, who requested an increase in wages, holidays with pay, uniforms, and other concessions. The Sub-Committee could not see their way to grant the request for clothing. Those dealing with holidays and wages have been referred to the Corporation Joint Committee on Wages.

Reading Gas Company's Savings Association.—It was reported at the annual meeting of the Reading Gas Company's Works Savings Association (the chair at which was taken by the President, Mr. D. H. Helps), that, though the membership has decreased, there are still 133 regular subscribers on the books. The decrease arose chiefly from the fact that men who were temporarily engaged have left the Company's service. The subscriptions since the commencement of the Association amounted to £1510, *plus* a bonus of £21 8s. granted by the Directors; and 1930 certificates have been issued. On the completion of the formal business an address was given by Mr. J. F. Coales, the Secretary of the Reading Savings Committee.

Limitation of Profits in the Coal-Mining Industry.—A resolution has been unanimously passed at a meeting of the Executive Committee of the Federation of British Industries, emphatically protesting against "the proposed limitation of profits in the coal mining industry to a fixed sum per ton, as being unsound in principle, and setting-up a precedent which, if followed, cannot fail to be destructive to the financial stability of the industries in this country and to limit the initiative and enterprise of manufacturere."

New Public Lighting Contract at Bridgwater.—The Bridgwater Gas Light Company have secured a five years' contract with the Bridgwater Corporation for lighting the town. The majority of the lamps are to be extinguished at 11 p.m.; and there is to be no public lighting from May 15 to Aug. 15 (inclusive). A few lamps, controlled by clockwork, are to be kept lighted all night in the main streets. The contract price is to rise or fall 4d. per lamp in the case of the 11 o'clock lamps, and 1s. per lamp per year in the case of all-night lamps, for every 1d. rise or fall in the price of gas to ordinary consumers.

STOCK MARKET REPORT.

LAST week failed to maintain the improved tone of markets on the Stock Exchange which characterized the week before. Weak spots were early apparent, profit-snatching set in where it was feasible, and dullness and inactivity supervened. However, on Friday there was a little more animation, and a partial recovery here and there.

The gilt-edged market showed weakness. Home Government issues drooped from day to day, until on Friday they found some support. Final quotations were: Consols 50¼-51⅛, War Loan 90⅞-91¼, Funding 75⅝-76⅛, and Victory 80½-81¼. Home Rails did well at first, but gave way on Wednesday, and closed dull. Argentines were firm on the whole.

The Foreign Market was not in good case. French were unable to stand up against the Exchange, and lower figures marked all the rest, whether European, Asiatic, or American.

Business in the Gas Market was in the aggregate quite equal to the standard of the preceding week, though the bulk of it was in the three big issues. The tone showed greater strength, prompted by the feeling that the Government really intend to ameliorate in some measure the inequitable statutory conditions under which the gas industry suffers. In the London Companies, Gas Light ordinary and South Metropolitan ordinary improved their quotations by 2 each. Suburban and Provincial were firm without change. Imperial Continental was very active and advanced another 4 in quotation.

Bargains done for cash during the week were as follows: On Monday, European 11⅞, Gas Light ordinary 63½, 63¾, 63⅞, 64, 64¼, 65, Imperial Continental 140, 140½, 141, 141⅛, 142, 142⅛, 143, 143⅛, 144, 144⅛, 145, 145⅛, 146, Primitiva 37s. 6d., ditto preference 68s. 9d., 70s., South Metropolitan 64, 64½, 65, 65½. On Tuesday, Brentford "A" 59, Gas Light ordinary 64, 64½, 65, Imperial Continental 143½, 144, 141¼, 144½, 145, Oriental 106, Primitiva 36s. 3d., 36s. 10½d, South Metropolitan 64, 64½, 65, 65¼, Wandsworth "B" 65. On Wednesday, Brentford "A" 59⅜, ditto "B" 55, Commercial 4 p.ct. 56, Croydon "A" 136, European 11¾, Gas Light ordinary 65⅛, 66, 66½, Imperial Continental 142, 142½, 143, 144, 144½, 145, Lea Bridge 88, Monte Video 77, Oriental 107, Primitiva 37s. 6d., 38s., 39s. 9d., ditto preference 66s. 3d., 67s. 6d., South Metropolitan 64½, 65, 65¼, 66, South Suburban 66½, Colonial 15s. 3d. On Thursday, Brentford "B" 55½, Gas Light ordinary 65½, 66, 66½, 67, ditto maximum 44⅜, ditto preference 65⅜, 66, ditto debenture 52, 53, Imperial Continental 143⅜, 144, 144⅛, 145, 145⅛, 146, ditto debenture 85, Lea Bridge 86½, 87, 88, 89, Liverpool 60⅜, Primitiva preference 68s. 1½d., ditto debenture 72, 72½, South Metropolitan 66, 67, ditto debenture 51, Tottenham "B" 53⅛, 54, Tynemouth 75, Croydon "C" 99, Watford 3½ p.ct. "B" 49¾, 50. On Friday, Bombay 5¼, British 25, 26¼. Cape Town debenture 66, Gas Light ordinary 66, 66½, 67, 68, ditto maximum 44⅛, ditto debenture 52⅛, 53, ditto 10 p.ct. bonds 162½, 163⅛, Imperial Continental 143⅜, 144, 144⅛, 145, 145½, 146, Primitiva 37s. 6d., ditto preference 67s. 6d., South Metropolitan 66⅜, 67½, ditto debenture 52, Tottenham "B" 53, 53⅛, 54.

In the Money Market there was a steady demand for the greater part of the week; but it relaxed before the close. Silver, after reaching the record of 76d. on Tuesday, fell back to 72⅝d. The Bank rate is 6 p.ct., as fixed on Nov. 6.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,868	"	Sept. 26	2½	2⅞	Alliance & Dublin Ord.	59—64	45—50	..
874,000	"	July 11	4	4%	Do. 4 p.c. Deb.	76—79	62—64	..
280,000	5	Oct. 30	7½	8%	Bombay, Ltd.	5⅞—6⅛	6½—5⅜	6¼
50,000	10	Aug. 28	16	12%	Bournemouth Gas and Water { 10 p.c.	20—30	19—20	..
988,110	10	"	7	7%	" B 7 p.c.	15—15½	10—11	..
115,000	10	"	6	6/-	" Pref. 6 p.c.	13½—14	9½—9⅝	..
159,740	—	June 27	—	4%	" 4 p.c. Deb.	..	66—67	..
993,045	Stk.	July 11	14	37/-	Brentford A Consolid.	281—286	56—61	59—59⅜
784,920	"	"	11	31/8	Do. B New	204—209	52—57	55—55½
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	76—78	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	64—66	..
214,775	"	Sept. 11	11	7½%	Brighton & Hove Orig.	208—213	123—128	..
244,200	"	"	8	5⅓%	Do. A Ord. Stk.	154—159	84—89	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Sept. 26	12½	10%	British	44—45	25—27	25—26¼
120,000	Stk.	June 27	4	4%	Do. 4 p.c. Deb. Stk.	88—90	63—65	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—63	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	6⅞—7½	..
100,000	10	Oct. 30	—	4½%	Do. 4½ p.c. Pref.	5—6	6½—7	..
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	61—66	66
127,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,518,280	"	Aug. 14	5/9/4	88/4	Commercial 4 p.c. Stk.	106—108	56—61	56
560,000	"	"	5½	26/8	Do. 5½ p.c. do.	108—106	52—57	..
475,000	"	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	50—52	..
300,000	"	"	4	—	Continental Union Ltd.	76—79	35—40	..
300,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	40—60	..
51,600	Stk.	Aug. 28	14½	12%	Croydon A 10 p.c.	..	135—145	136
278,400	—	"	11½	9%	Croydon B and C 7 p.c.	..	95—105	..
493,270	Stk.	"	6	5⅛%	Derby Con. Stk.	128—128	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,002,180	10	July 30	10	5/0	European, Ltd.	17½—18	11½—12½	11⅞
16,298,975	Stk.	"	4/17/4	80/-	Gas Light and Coke { 4 p.c. Ord.	98—102	65—68	63½—68
2,600,000	"	"	3½	26/8	" 3½ p.c. max.	76—79	44—46	44½
4,062,285	"	"	4	4%	" 4 p.c. Con. Pref.	96—99	65—68	65½—66
4,674,850	"	June 11	3	3%	" 3 p.c. Con. Deb.	72½—74½	52—55	52—53
180,000	"	"	10	10%	" 10 p.c. Bonds	..	..	162½—163½
89,500	"	Sept. 11	5	4½%	Hastings & St. L. 5 p.c.	..	57—62	..
258,740	"	"	3½	2⅞%	Do. 3½ p.c	37—39	40—45	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	16½—16½	8½—9½	..
86,600	Stk.	Aug. 28	9	8½%	Hornsey 7 p.c.	..	90—95	..
131,600	"	Sept. 11	7½	5½%	Ilford A and C.	151—154	88—98	..
65,780	"	"	6⅔	4⅔%	Do. B	115—118	67—72	..
55,500	"	June 27	4	4%	Do. 4 p.c. Deb.	92—94	61—64	..
4,948,060	"	May 14	9	4½%	Imperial Continental	158—160	142—147	140—146
1,235,000	"	Aug. 14	8½	3½%	Do. 3½ p.c. Deb. Red.	84—86	84—87	85
235,942	"	Sept. 11	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	86—91	86½—89
2,498,966	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A	211—218	..	60⅜
						146—148		
806,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
165,736	"	Aug. 14	7/5/8	8⅜%	Maidstone 5 p.c.	..	56—61	..
75,000	5	June 11	6	5%	Malta & Mediterranean	4½—4⅝	1½—2½	..
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	98—101	90—97	..
841,220	Stk.	Nov. 27	4	5%	Monte Video, Ltd.	11½—12	75—80*	77
1,675,895	"	July 30	4½	3½%	Newcastle&Gateh'd Con.	98½—99½	63—65	..
532,766	"	June 27	3½	3½%	Do. 3½ p.c. Deb.	83—88	57—58	..
15,000	10	Sept. 11	—	11%	North Middlesex 10 p.c.	..	18½—18⅝	..
55,940	10	"	7/14/0	7½	" " 7 p.c.	14—15	9—9½	..
800,000	Stk.	Nov. 27	8	8%	Oriental, Ltd.	117—122	102—105*	106—107
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅝	4⅜—5½	..
60,000	50	Aug. 28	12	7½%	Portsea, Island B	128—131	74—76	..
100,000	50	"	12	6⅔%	Do. C	118—121	66—68	..
349,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅞—2½	36/8—39/9
499,950	5	June 26	5	—	Do. 5 p.c. Pref.	4⅝—5	2½—3⅜	66/8—70/-
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	71—73	72—72½
600,000	Stk.	July 30	4	4%	Do. " " 1911	..	49—52	..
846,198	"	June 27	4	4%	River Plate 4 p.c. Deb.	85—87	49—52	..
150,000	10	Sept. 26	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7½—8	..
125,000	50	July 2	5	5%	" 5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Aug. 28	10	5%	Sheffield A	228—234	57—92	..
209,984	"	"	10	5%	Do. B	222—234	57—92	..
528,500	"	"	10	4⅜%	Do. C	220—222	80—85	..
183,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	Oct. 15	9	10%	South African.	10½—11½	12—13	..
6,609,895	Stk.	Aug. 14	5/4/0	80/-	South Met. 4 p.c. Ord.	111—118	65—68	64—67½
950,000	"	July 11	—	5%	Do. Pref.	..	94—96	..
1,895,445	"	"	3	3%	Do. 3 p.c. Deb.	72½—74½	51—54	51—52
224,290	"	Aug. 14	8½	5%	South Shields Con. Stk.	157—159	104—106	..
962,795	"	"	6	3⅞%	S'th Suburb'n Ord. 5 p.c.	114—116	68—73	66½
187,568	Stk.	June 27	5	5%	Do. 5 p.c. Deb. Stk.	116—118	85—88	..
647,740	"	Nov. 18	7½	3⅛%	Southampton Ord.	99—102	61—63	..
121,275	"	June 27	4	4%	Do. 4 p.c. Deb. Stk.	..	63—65	..
120,000	"	Aug. 14	—	4⅜%	Tottenham { A 5 p.c.	185—188	70—75	..
782,275	"	"	6	3⅜%	" District { B 3½ p.c.	115—117	50—55	53½—54
181,255	"	June 26	4	4%	" { 4 p.c. Deb.	87—89	64—66	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
236,476	Stk.	Sept. 26	5	3⅛%	Tynemouth 5 p.c. max.	108½—109	74—76	75
					Wandsworth, Wimbledon, and Epsom—			
80,000	"	Aug. 28	8½	55/-	Wandsworth A 5 p.c.	151—155	85—90	..
266,686	"	"	6½	40/-	Do. B 3½ p.c.	129—134	63—68	65
108,075	"	"	—	38/6	Do. C	..	63—68	..
140,865	"	"	—	38/6	New Ordinary	..	63—68	..
352,000	"	"	6½	35/9	Wimbledon 5 p.c.	117—122	65—7	..
98,000	"	"	6⅔	40/-	Epsom 5 p.c.	121—126	65—7	..
88,416	"	June 27	3	3%	3 p.c. Deb. Stk.	66—69	49—51	..

* Ex Div.

Daring Gas-Works Outrage.—An extraordinary incident occurred at Naas (co. Kildare) last week. The Kildare County Hunt Ball was being held at the Town Hall, and dancing was in full swing when the gas supply suddenly failed, and other lights were procured. It was ascertained that masked men had entered the gas-works, and, presenting a revolver at Patrick M'Donnell, the night man, ordered him to shut off the supply, which he did. With a sledge-hammer the men smashed the main to the town, and then quietly walked away.

Messrs. James Milne & Son, Limited, have appointed Mr. A. G. Squires (late representative of the Davis Gas-Stove Company, Ltd.) as their representative in Scotland and Ireland, for gas-meters, lamps, and gas-works plant generally. Mr. Squires will operate directly from the works, instead of through the Glasgow and Edinburgh branches, as heretofore.

A representative of a well-known Auckland firm of manufacturers' agents is at present in this country, and desires to arrange with United Kingdom manufacturers of upright incandescent gas-mantles, gas-burners, &c., to act as their representative for the whole of New Zealand. He is prepared to interview firms interested in appointing an agent there. Replies should be addressed to the Department of Overseas Trade (Development and Intelligence), No. 35, Old Queen Street, S.W.—quoting "New Zealand, No. 1094."

The Halifax Gas Committee have decided not to make any change in the price of gas, but to reduce the charge for coke by 10s. per ton, if the 10s. reduction in coal is adhered to by the Government.

The Huddersfield Corporation request gas consumers to be economical in its use, because of the insufficient coal deliveries and gas plant renewals caused by the moulders' strike. Unless an improvement takes place soon, a reduction of gas pressure will become necessary.

The danger of water-slide chandeliers was illustrated on Nov. 22, when an explosion occurred at Castleford, in the residence of a bank manager, through, it is believed, a deficiency of water in a gas-chandelier, three burners on which had only just been lighted. Considerable damage was done to the room and its contents.

The fourth annual distribution of prizes to school girls, under the scheme promoted by the York Gas Company's cookery competition, took place on the 28th ult. There were 23 competitors; and, in addition to the first three winners, each competitor who had been unsuccessful was presented with a cookery book.

The "Globe" says that St. John's Church, in Smith Square Westminster, enjoys the distinction of being the first church in the world to be lit by gas, though it seems that for some reason "the introduction of the new illuminant was deeply resented by many conservative spirits, some of whom went so far as to describe it as a sacrilege."

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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THE UNIVERSITY OF SHEFFIELD.

APPOINTMENT OF ASSISTANT LECTURER AND DEMONSTRATOR IN FUEL.

THE Council are about to Appoint an ASSISTANT LECTURER and DEMONSTRATOR in FUEL. Salary, £300 per Annum.

Applications must be sent in by Dec. 20.

Further Particulars may be obtained from

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CHEMIST required by a Gas Company in the South of England making 750 Million Cubic Feet per Annum. Applicants must have had good previous Experience and be Capable of Carrying Out all Tests and Analyses as may be required on an up-to-date Gas-Works. Salary, £225 per Annum.

Address, giving full Particulars and Stating Age, together with *Copies* (which will not be returned) of not more than Three Testimonials, to No. 6802, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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Apply, by letter, with full statement of Training Qualifications and Experience, to No. 6803, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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Applications, stating Qualifications, to be sent to No. 6805, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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WANTED, at once, a Thoroughly Experienced RENTAL CLERK, to Take Charge of the Slot and Ordinary Gas Rentals.

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Gas-Works,
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Apply, stating Age, Training, and Qualifications, also Works Experience, to No. 6810, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WANTED by a Gas Company near London a DISTRIBUTION FOREMAN. Practical Gas-Fitter, used to all kinds of Gas Apparatus, also Mains and Services.

Apply, stating Age, Experience, and Wages Required, to No. 6808, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

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Write, in confidence, to No. 6807, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

WORKS Foreman required for 350 Million Works in the Midlands. Eight-Hour Shifts. Good Mechanical Knowledge necessary. Wages, £4 10s. per Week.

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WORKS Foreman wanted. Wages £4 per Week, with House, Gas, and Coal.

Apply, stating Age and Experience, to R. J. MEIKLEJOHN, GAS-WORKS, RUGBY.

APPOINTMENTS, &c., WANTED.

EX-OFFICER, recently Demobilized, DESIRES POSITION in Gas-Works, Home or Abroad. Good Training in Large Works in North. Excellent Testimonials.

Address No. 6809, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

PLANT, &c., FOR SALE & WANTED.

LOANED to some person unknown, by the late Mr. J. Armitage Drake, copy of Volume II. CHEMICAL TECHNOLOGY, edited by Groves and Thorp. Brown Cloth Binding. Another copy is required to complete the Set.

State Condition and Price to DRAKES, LIMITED, HALIFAX.

STEEL Joists for Sale.—Sections, 18 by 6½, 18 by 7, 20 by 7½. Approximate Total Weight, 16 tons.

Further Particulars on Application to the GAS ENGINEER, HALIFAX, with whom Tenders, endorsed "Steel Joists," are to be lodged on or before Dec. 5, 1919.

FOR Sale.—Ammonia Still and HEATERS. Capacity, 5 to 6 tons per diem. Approximate Weight of Materials, 34 Tons of Cast-Iron Plates, 7 Tons of Steel Plates.

The Purchaser to Dismantle and Remove.

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WANTED.—Coke Breeze, about 5 Tons per Week. Delivered Penzance.

The ALGIN COMPANY, LTD., PENZANCE.

MACHINE TOOLS for Immediate Delivery—

6—No. 9 Herbert TURRET LATHES. All-Geared head, 3½ in. hole through Spindle (without Cross-slides). Excellent Condition.
1—1¼ in. capacity Foster TURRET LATHE, Bar Feed, Cut-Off Rest, Pump.
1—New 1½ in. Capacity Foster CAPSTAN LATHE, 8½ in. Centres, Bar Feed, Cut-off Rest, Pump.
1—10½ in. by 10 ft. Straight Bed S.S.S. and Screw Cutting LATHE by Dean Smith and Grace, Pump, Chuck. Very Good Condition.
3—12 in. by 14 ft. Straight Bed Sliding and Surfacing LATHES by Stirk, Double Back Geared. Good Condition.
1—New 8½ in. by 8 ft. Gap Bed S.S.S. and Screw Cutting LATHE, Pump, and 14 in. "British Bulldog" Chuck.
3—New 9½ in. by 8 ft. Straight Bed S.S.S. and Screw Cutting LATHE, Pump and Chuck.
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4—5½ in. by 5 ft. Straight Bed S.S.S. and Screw Cutting LATHES, Back Geared, with Chucks, Steady Four-Way Tool Box. Good Condition.
1—18 in. Stroke by 10 ft. 6 in. Bed Traversing Head Double-Headed SHAPING MACHINE, Two Tables, by Wilkinson. Scarcely used at all.
2—New 14 in. stroke SHAPING MACHINES.
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Send Price with Drawing or Photo. and full Particulars to No. 6806, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

FOR Sale.—
35 H.P. "National" GAS-ENGINE.
14 H.P. "National."
20 H.P. Crossley Direct Coupled to Lancashire Dynamo, 110 Volts D.C.

Apply, SMITH, IMBER COURT, THAMES DITTON.

FOSTER Pyrometer to 900° C. Wall Instrument, comprising One Indicator and Switchboard (Multiple) 11 Way Change Over. One Recording Instrument, Flexible Connections, &c.

GAS BARREL, 3-in., 4-in., 5-in.—100 feet of each, with Fittings.

Apply, SMITH, IMBER COURT, THAMES DITTON.

TO Gas and Electricity Works.—You cannot Complete your Works without using CHARKHAM'S Chemically Cleaned, Washed, Sterilized, and Calendered MACHINERY WIPING MATERIAL—no Wrinkles. Packed in ¼ cwt. pressed bales at 68s. per cwt.; ½ cwt. Sample sent Carriage Paid to any Districts on receipt of your Cheque for 30s. Provincial Inquiries invited. The Wipers are famous for cleanliness. Send us your orders and we will do the rest.

J. CHARKHAM, Arthur Street, ALDERSHOT.
Telephone: Aldershot 60.

WANTED—A 300 or 500 Light Wet METER.

Particulars and Price to No. 6803, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

CONTRACTS OPEN.

MANCHESTER CORPORATION.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the Supply and Delivery of FIRE-CLAY and SILICA GOODS required during next season at their several Gas-Works.

Full Particulars and Form of Tender may be obtained on Application to Mr. Fredk. A. Price, Superintendent, at the Gas Offices, Town Hall, Manchester, on payment of a Deposit of One Guinea, which will be returned on receipt of a *bona-fide* Tender.

Sealed Tenders, endorsed "Tender for Fire-Clay Goods or Silica Goods" as the case may be, addressed to the Chairman of the Gas Committee, must be Delivered at the Gas Offices, Town Hall, Manchester, not later than 10 a.m., on Thursday, the 18th day of December, 1919.

The Gas Committee do not bind themselves to accept any Tender, and reserve to themselves the right to divide any Offer as they may deem advisable.

By order.
THOS. HUDSON,
Town Clerk.

Town Hall, Manchester,
Nov. 26, 1919.

BOROUGH OF STOURBRIDGE.
(GAS DEPARTMENT.)

TENDERS invited for—
A.—VERTICAL RETORTS.
B.—MOTOR-DRIVEN BLOWER

Particulars on Application to the undersigned.

CHARLES H. WEBB, M.Sc., Assoc.M.Inst.C.E.,
Engineer and Manager.

Gas-Works, Stourbridge,
Nov. 25, 1919.

COMPANY NOTICE.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company, SO FAR AS THEY RELATE TO DEBENTURE STOCK and BONDS, WILL BE CLOSED at Four o'clock p.m., on Wednesday, the 10th prox., for the Half-Year ending on the 31st prox., and will be RE-OPENED on the morning of Thursday, the 11th prox.

The Interest for the Half Year will be Payable on the 1st January next to the Proprietors registered on the closing of the Books.

By order,
WILLIAM LYLE GALBRAITH,
Secretary.

Chief Office,
Horseferry Road,
Westminster, S.W.
Nov. 26, 1919.

STOCKS AND SHARES.

New Issue of Capital.

LEA BRIDGE DISTRICT GAS COMPANY.

£20,000 SIX PER CENT. REDEEMABLE DEBENTURE STOCK

to be redeemed at Par in Ten Years—viz., on the 31st of December, 1929.

The Interest on the Debenture Stock (including the present issue) requires £2995 per Annum. This is a first charge on the Net Revenue of the Company which for the Twelve Months ended June 30 last was £17,706. The Interest therefore is thoroughly well secured.

The Reserve and other Accumulated Funds amount to £27,615.

MESSRS. A. & W. RICHARDS (William Richards) are Instructed by the Directors to ISSUE the above STOCK by AUCTION, at the Cannon Street Hotel, London, E.C., on Tuesday, Dec. 16, at Two o'clock, in Lots.

Particulars of the AUCTIONEERS, 37, WALBROOK, E.C. 4

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that they hold PERIODICAL SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES.

Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to Messrs. A. & W. RICHARDS, at 37, WALBROOK, E.C. 4.

CARBURINE & BENZOL FOR GAS ENRICHING

ALSO
THE MAXIM PATENT CARBURETTOR.

For Prices, &c., apply to
The GAS LIGHTING IMPROVEMENT CO., Ltd.
SALISBURY HOUSE, LONDON WALL, E.C.
Telephones: 4451, 4452, 4453, and 4454 London Wall,
Telegraphic Address: "Carburine, London."

H. MITCHELL, FOR PATENT SLOT METER PAD & OTHER LOCKS. T. & J. LEIGHTON ROAD, KENTISH TOWN, N.W.
T. & J. DEMPSTER, LTD., ELSINORE BUILDINGS, BROADWAY, WESTMINSTER, S.W. 1. MANCHESTER.